Very Truly
George Thurber

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Page 18, last line, for Delessaria, read Delesseria.
" 18, " " " Rhodomenia, read Rhodymenia.
" 31, 4th line from bottom, 1st column, for Elscholtzia, read Elsholtzia.
" 46, line 8, for Marigold, read Mangold.
" 49, line 24, for completes read commences.
" 109, third line from bottom, for both, read host.
" 135, line 32, for Salia, read Salix.
" 220, last line, for Devæa, read Devoea.
" 316, line 20, for avenicola, read arenicola.
" 322, last line but one, for Dematium, read Dermatium.

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Revision of the United States species of the genus Fuirena.

By Frederick V. Coville.

Plate XCVIII.

The various forms of *Fuirena* grouped under the name *F. squarrosa*, Mx., show much variation in both external and internal characters. The external variations are confined commonly to those of size, hairiness, and inflorescence. The height varies from 5 cm. to 90 cm.

Hairiness of the leaves, stem, and sheaths seemed at first to form the basis of good varietal distinctions, but a careful comparison of specimens shows that there is sometimes wide variation within the limits of a variety. I am inclined to believe that these differences may be due largely to individual environment. They certainly are not in all cases co-ordinate with other well defined characters.

The width of the leaves varies, in the specimens that I have examined, from 1 mm. to 7 mm. according to the size of the plant. The inflorescence varies from a single spike to one or a few several-spiked heads. The internal variations noted are in the length of the stipe of the achenium, the length and roughness of the bristles, and several variations in the perianth-scales.

The achenium may have a stipe equal to its own length, or may be nearly sessile. The bristles are sometimes shorter than the stipe of the achenium, when they are usually smooth; or they may equal the achenium, or even greatly exceed it. In these latter cases they are retrorsely barbed.

The perianth scales have a stalk reaching to about the base or middle of the achenium, and there expanding into a blade (usually referred to as the scale). The scale varies in form from narrowly oblong with acute apex and base, to broadly oblong with obtuse apex and base, and deltoid ovate with acute apex and cordate or truncate base. It varies also much in thickness, that part which lies above the middle of the achenium being spongy, thickened and plump; in mature specimens the lower portion, by compression against the achenium, being thin and showing three, or sometimes only one, nerve. In immature specimens the scales are not thick and plump above but of nearly the same leathery texture throughout, the nerves traceable to the apex. The middle nerve may end in a mere apiculation, in some cases wanting, or may be produced into a short blunt point or long barbed awn. And in some cases this awn may arise on the back of the scale slightly below the apex.

While making an examination of the forms that have been grouped under *F. squarrosa* it seemed desirable to include as well our other entirely distinct species, *F. scirpoidea;* and as a result the following revision of the species of *Fuirena* of the United States is presented.

The localities given after each species and variety were taken (except in one case which is indicated) from actual specimens examined by the writer. These were in the herbaria of Columbia College, Harvard University, Cornell University, Academy of Natural Sciences of Philadelphia, William M. Canby, Isaac C. Martindale, John Donnell Smith, and the National Herbarium; and thanks are due to these three gentlemen, to Dr. Sereno Watson, Dr. N. L. Britton, Prof. William R. Dudley and John H. Redfield, for their kindness in facilitating the work.

To Dr. Britton I am especially indebted for notes from Mr. C. B. Clarke of Kew, and for many valuable suggestions. The specimens in the Shaw herbarium were examined, but by an oversight the localities are not included.

FUIRENA.

Rottboell, Descr. et Icon. Pl. p. 70 (1773).

Inflorescence in terminal and axillary heads of spikelets, the axillary ones sometimes wanting, and the terminal one reduced even to a single spikelet. Spikelets many-flowered. Glumes imbricated on all sides, aristate or mucronate, the lowest one or two empty. Flowers hermaphrodite. Perianth-scales three, not conduplicate, commonly stipitate, membranaceous or thickened, in the American species with as many bristles alternating. Stamens three. Style single, slender, not thickened at the base nor articulated with the ovary, deciduous. Stigmas three, slender. Achenium about as broad as long, sharply and equally triquetrous, mucronate.

KEY TO THE SPECIES AND VARIETIES.

a. Leaves reduced to bladeless sheaths. *F. scirpoidea.*

aa. Leaves with well-developed blades. (*b*).

  b. Awn arising abruptly from the back of the perianth-scale, just below its apex. *F. simplex.*

  bb. Awn when present borne on the apex of the perianth-scale, which tapers into it. (*c*).

    c. Bristles reaching at least to the middle of the achenium, retrorsely barbed. (*d*).

      d. Perianth-scales narrowly to broadly oblong with a slender awn tapering to a minute point. *F. squarrosa.*

      dd. Perianth-scales rhomboidal or deltoid-ovate with a thick short awn or point. *F. squarrosa var. hispida.*

    cc. Bristles not exceeding the stipe of the achenium, smooth. Perianth-scales awnless or with a mere apiculation. *F. squarrosa var. breviseta.*

FUIRENA SCIRPOIDEA.

Rhizome conspicuous, stout, the stems arising from it singly at frequent intervals. Stems slender, about 20-40 cm. in height, unbranched, terminated by 1-3 spikelets. Sheaths 2 cm. long or less, loose, acute, bladeless. Glumes mucronate, the points appressed. Achenium sessile or nearly so by a narrow base. Bristles sometimes reaching the apex of the achenium and retrorsely barbed, sometimes nearly obsolete. Scales orbicular-oblong, obtuse at the apex or nearly apiculate, minutely scabrous along the upper margin.

Michaux, Fl. Bor.-Amer. i. p. 37, t. 7 (1803); and other authors. *Vaginaria Richardi*, Pers. Syn. Pl. i. p. 70 (1805); and other authors.

This plant is very distinct from the other species and shows little variation. The structure of the fruit is very similar to that of *F. squarrosa var. breviseta*, the bristles being usually longer and barbed, and the stipe of the achenium and the stalks of the scales shorter.

Georgia (Leconte). Florida (Rugel, Keeler); Miami (Garber); Duval County (Curtiss); Lake Monroe (Garber); St. Augustine (Canby); Apalachicola (Chapman, Saurman); Jacksonville (Curtiss No. 3067). Alabama; Mobile (Mohr). Louisiana; below New Orleans on the Mississippi (Langlois); New Orleans (Ingalls).

FUIRENA SIMPLEX.

Rhizomes usually wanting, and stems tufted. Leaves with well developed, flat, grass-like blades. Glumes with a long squarrose or recurved awn. Achenium nearly sessile. Bristles reaching about to the apex of the achenium, retrorsely barbed. Scale-stalks reaching to the base or middle of the achenium. Scales ovate-oblong, obtuse at the base, with a tendency to become cordate, unusually notched at the obtuse apex. Awn slender, commonly smooth, occasionally retrorsely barbed, sometimes fully as long as the body of the scale, sometimes short and minute, arising abruptly from the back of the scale just below the apex.

Vahl, Enum. Pl. ii. p. 384 (1806). *F. squarrosa*, Torrey Ann. Lyc. Nat. Hist. N. Y. ii. p. 252† (1828).* *F. squarrosa* var. *aristulata*, Torrey, l. c. iii. p. 291 (1836).* *F. Schiedeana*, Kunth, Enum. Pl. ii. p. 183 (1837), fide Boeckeler, Linnaea, xxxvii. p. 105.

Plant 8-50 cm. in height, prevailingly smooth, and frequently with short thickish leaves. It differs conspicuously from all the other forms in that the awn rises abruptly, not by a gradual tapering, from the scale. The scales become plump much earlier than in *F. squarrosa*, so that it is seldom possible to find one that shows the nerves, and when mature they are uniformly of a pale buff color, while in *F. squarrosa* they are commonly chestnut-brown.

Arkansas (?) (Long's first expedition, James). Indian Territory (?); Canadian River (Bigelow). Texas (Wright No. 718, 1849; Lindheimer No. 557, 1846); Sutherland Springs (Palmer No. 1335, 1879); Eastern Texas (Hall No. 693, in part, 1872); Fredericksburg (Thurber No. 72, 1850); Dallas (Reverchon No. 562, 1876; Hempstead (collector unknown). New Mexico (Fendler No. 877, 1847). Mexican boundary Survey No. 1523. Herb. Berlandier Texano-Mexicanum No. 3224. Mexico (F. Mueller No. 2147, 1853); Monclova (Palmer No. 1336, 1880).

✓ Forma MACROSTACHYA (Britt.)

F. squarrosa var. macrostachya, Britt., Bull. Torr. Bot. Club, xi. p. 87 (1884).* This appears to me to differ from the typical form of *F. simplex* scarcely enough to be called a variety, and Dr. Britton agrees with me in this opinion. It is unusually large throughout, with long (about 2 cm.) spikelets. "Valley of the lower Rio Grande" (Buckley).

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* Type specimens examined. † Paper of 1828 read in 1826.

FUIRENA SQUARROSA.

Rhizomes,* leaves and glumes as described under *F. simplex*.

Achenium nearly sessile. Bristles slender, tapering to the apex, usually exceeding the achenium, retrorsely barbed. Scale-stalk reaching the middle of the achenium. Scale narrowly to broadly oblong, acuminate at both ends, or sometimes abrupt at the base, frequently only one-nerved, tapering into a slender tapering awn usually exceeding the scale and smooth or backwardly barbed.

Michaux, Fl. Bor.-Amer. i. p. 37 (1803). *F. squarrosa*, var. *pumila*, Torrey, Compend. Fl. North. & Mid. States, p. 46 (1826); Ann. Lyc. Nat. Hist. N. Y. iii. p. 291 (1836) †; Fl. N. Y. ii. p. 345 (1843); Gray Man. Bot. (5th Ed.) p. 556, Pl. II. (1867).

Plant usually small, 5-15 cm. in height, but sometimes reaching 60 cm., mostly smooth except the lower sheaths. Inflorescence sometimes reduced to a single spikelet. The bristles are sometimes twice as long as the stipe and achenium together, and the awn in such cases may equal the scale and its stalk. The barbing of the awn is more conspicuous in these two cases, and wanting in the other extreme. I have seen one depauperate specimen in which both bristles and awns were almost entirely wanting, but the plant undoubtedly belonged here.

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* After this paper was completed the writer, while in the field one day, saw for the first time (never having lived in a region in which *Fuirena* grew) a living specimen of *F. squarrosa*, var. *hispida*. While collecting some of the plants he was astonished to find that the rootstocks were plentifully supplied with ovoid tubers about 5 mm. in diameter. It has been learned since that Mr. Theodore Holm of Washington had observed the same organs, and has found the character a constant one. He is preparing a paper on the subject. Not one of the large number of herbarium specimens examined during the work of revision bore a tuber, and I cannot now say whether they are found in any of the other forms. The specimens of the typical form, however, look as if they had never borne tubers.

† The following are given by Torrey in this article as synonyms. I have been unable to examine the descriptions myself. *F. squarrosa var. pumila*, Torrey, Fl. North. & Mid. States i. p. 68 (1824); *F. pumila*, Sprengel, Syst. Veg. i. p. 237 (1825); Schultes, Syst. Veg. Mant. iii. p. 546 (1827). *F. Torreyana*, Beck, Bot. North. and Mid. States p. 429 (1833).

By the kindness of Mr. C. B. Clarke of the Royal Herbarium at Kew, I have been able to ascertain that this is the typical form of Michaux's *F. squarrosa.* He writes "Our original specimen of Michaux named *squarrosa* is the slender plant 6 to 8 inches high with fibrous roots, in short=*simplex* Vahl. var. *pumila* sp. Spreng."

Although in the extreme forms of this and var. *hispida* the internal characters are so widely different, a series of connecting forms exists, co-ordinate to some extent with the size of the plant. The original specimen of Michaux as well as Torrey's type of var. *pumila* were small plants, but a series has been made (whose internal characters are identical and whose only external difference is one of size), of which the largest specimen is, as stated above, 60 cm. in height.

Massachusetts; Plymouth (Oakes, Tuckerman); Tewksbury (Torrey, Boott). Rhode Island; Providence (Olney). Long Island, Babylon (Torrey). New Jersey; Monmouth County (Eaton); Cape May (Parker). Delaware; Townsend (Canby). Maryland; Salisbury (Canby). North Carolina; Wilmington (Canby). Florida; Micanopy (Leavenworth); Duval Co. (Curtiss No. 3068, in part). Louisiana (Hale). Michigan, Cass Co. (Wright, specimen in herbarium of Isaac Martindale); "Macomb County, Dr. B. Cooley" (Wheeler & Smith Cat. Pl. Mich. p. 86).

FUIRENA SQUARROSA, MICHX., VAR. BREVISETA.

Stipe and achenium usually of equal length. Bristles not exceeding the stipe, smooth. Scale-stalks reaching above the middle of the achenium. Scales broadly oblong or orbicular, rounded at the apex, with an abrupt apiculation, minutely scabrous along the upper margin.

F. squarrosa, Chapman, Fl. South. States, p. 514 (1865). *F. squarrosa*, var. α, Torrey Ann. Lyc. Nat. Hist. N. Y. iii. p 290 (1836).*

The plants are usually 10-20 cm. in height, and may be almost smooth throughout, or the sheaths, especially the lower ones, may be densely hirsute, and the leaves and culm sparingly so. The tips of the bristles are usually incurved into the space below the nut. The stipe of the achenium and the stalks of the scales are longer than in any other North American form of the genus. The scales in this form do not become so plump as in the typical form, the var. *hispida* and *F. simplex*, and in mature specimens it is frequently necessary to use a compound microscope to see the scabrosity of their upper margins.

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* Type specimens examined.

I have never had any difficulty in deciding whether a specimen went into var. *hispida* or var. *breviseta*, the distinctive characters, although slight, being clearly defined and constant. Nevertheless these differences seem too inconsequential for the basis of a separate species, and although intermediate forms have not been seen, they may be expected.

North Carolina (McCarthy); Wilmington (Curtiss). South Carolina (Gibbs); Santee Canal (Ravenel). Georgia; Macon (collector not given); Sunbury (Le Conte). Florida (Chapman, Buckley); Duval County (Curtiss No. 3068, in part); Miami (Garber); Apalachicola (Saurman). Alabama (Gates, Mohr). Louisiana (Langlois); New Orleans (Ingalls, Drummond). Eastern Texas, (Neally).

FUIRENA SQUARROSA, var. HISPIDA (Ell.), Chapm.

Stipe a little shorter than the achenium. Bristles reaching about the middle or apex of the achenium, retrorsely barbed down the inner face. Scale-stalks reaching the middle of the achenium. Scales rhomboidal, or deltoid-ovate with cordate or truncate base, tapering into a short thick unbarbed awn or point, usually minutely scabrous along the upper margin and about the base of the awn.

Chapman, Fl. South. States, p. 514 (1865); *F. hispida*, Elliott, Sketch Bot. S. C. & Geor. i. p. 579 (1824).* *F. squarrosa*, Torrey, Compend. Fl. Nor. & Mid. States, p. 45, (1826)†; Gray, Man. Bot. p. 556 (1867). *F. squarrosa, var. β.* Torrey, Ann. Lyc. Nat. Hist. N. Y. iii. p. 291 (1836).* *F. squarrosa*, var. *γ*, Torrey l. c.* *F. squarrosa*, var. 1, Torrey, Fl. N. Y. ii. p. 345 (1843).

Plant 40-90 cm. in height, usually slender, with long internodes, the sheaths almost always, and the stem and leaves frequently, densely hirsute. A great range of variation in the appearance of the scales occurs, they when immature being coriaceous and showing the three nerves; but when mature being very plump, apparently nerveless, and sometimes with merely an acute apex in place of the awn. Occasionally some of the fruits in a spike have been found with bristles unbarbed. In fully mature specimens this is especially apt to be true, and at the same time the scabrosity of the apex of the scale becomes lost. Torrey's type of var. γ are immature specimens of a form of this variety with scales narrower than usual, and awns longer, the plant varying toward *var. pumila.*

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* Type specimens examined.

† *F. squarrosa* Torr. Fl. N. & Mid. States i, p. 67 is also probably a synonym. I have been unable to see the work.

In his description of the species *F. squarrosa* and *F. hispida,* Elliott said very little of the characters of the perianth scales, but characterized the last species principally by its slender habit and hirsute sheaths. *F. squarrosa* was described first and a drawing made.* This drawing is curiously enough an excellent one of the *var. hispida,* afterward described in the appendix as a species, with no reference to the figure. It seems clear, therefore, that Elliott, at that time at least, did not understand the true distinctions of the two forms, basing them on characters usually present but not crucial.

New York; Junius, Seneca County (Sartwell). New Jersey (Eaton, Torrey); Cape May (Martindale). Maryland, Salisbury (Canby, Moyer). Virginia; Prince Edward County (J. D. Smith). District of Columbia (Ward). South Carolina; Aiken (Ravenel). Georgia (Chapman). Kentucky (Short). Florida (Buckley, Chapman). Alabama (Bigelow); Montgomery (McCarthy). Louisiana (Hale). Texas (Lindheimer No. 204, 1843, Nealley); Hempstead (Hall No. 693, in part, 1872).

EXPLANATION OF THE PLATE.

Figures of the fruit, (achenium, bristles, and perianth-scales) of *Fuirena.* All enlarged about ten diameters.

1.—*F. scirpoidea,* Michx.
2.—*F. simplex,* Vahl.
3.—*F. squarrosa,* Michx.
4.—*F. squarrosa,* Michx. var. *hispida* (Ell.), Chapm.
5.—A scale of the same, as it appears when young.
6.—*F. squarrosa,* Michx. var. *breviseta,* Coville.

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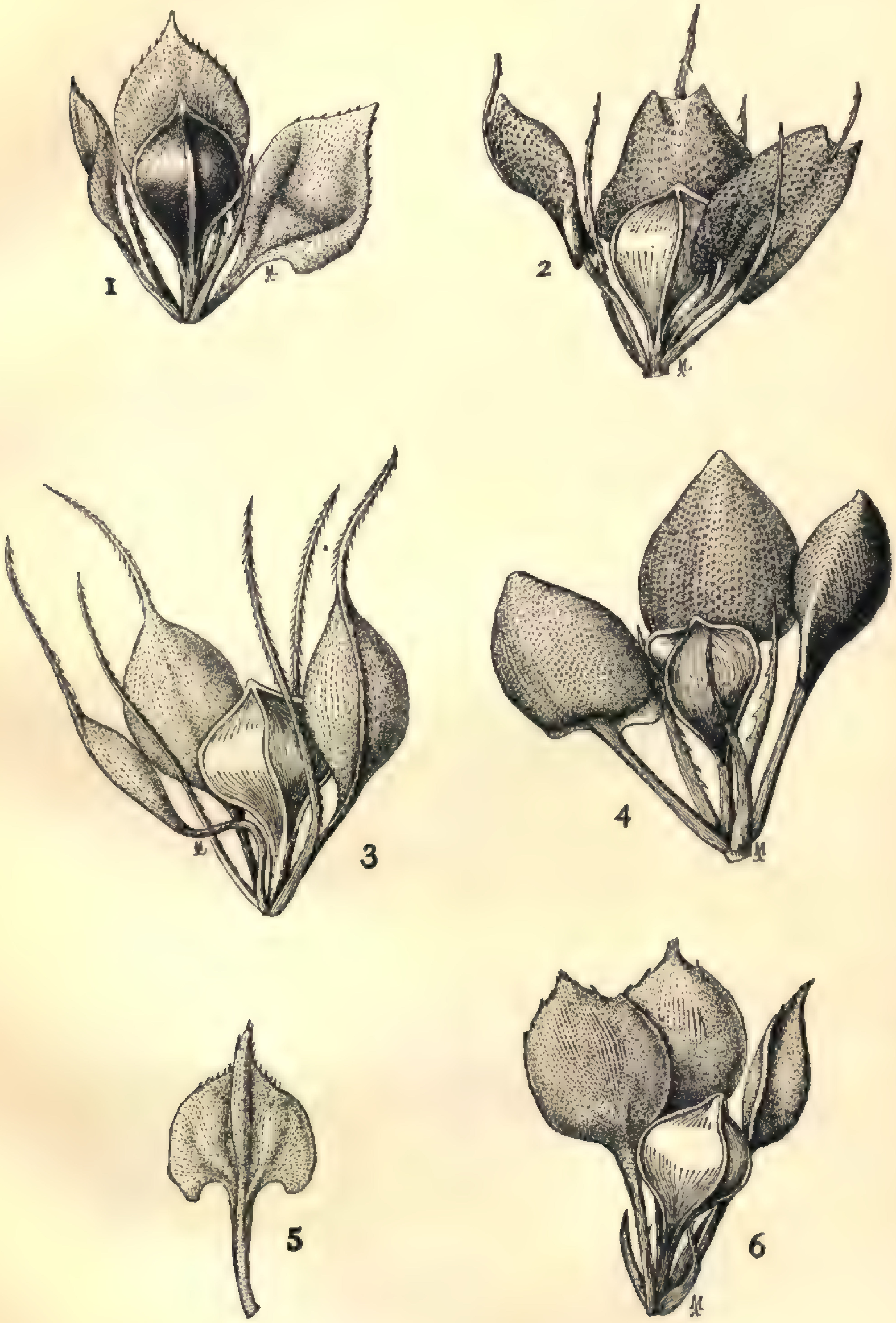
* Ell. Sk. i. pl. I. fig. 3.



United States Species of Fuirena. F. V. Coville.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—X.

(Continued from Vol. XVI, p. 327.)

Inga strigillosa, Spruce in Mart. Fl. Bras. Reis, 1,500 ft. (1002).

Inga nobilis, Willd. Enum. 1047. Mapiri, 2,500 ft. (1003).

Inga edulis, Mart. Herb. fl. Bras. 113. Unduavi, 8,000 ft. (991); Junction of the Beni and Madre de Dios (995).

Inga marginata, Willd. Sp. Pl. iv. 1015. Guanai, 2,000 ft. (994; 998; 999).

Inga punctata, Willd. l. c. 1016. Beni River, (1000).

Inga Matthewsiana, Benth. in Hook. Lond. Journ. Bot. iv. 594. Guanai, 2,000 ft. (996).

Inga tomentosa, Benth. Trans. Linn. Soc. xxx. 609. Mapiri, 5,000 ft. (997).

Inga stipularis, DC. Mem. Leg. 440. Mapiri, 5,000 ft. (1004).

INGA BOLIVIANA, spec. nova. Flores tomentelli, in receptaculo distincte pedicellati, umbellam globosam formantes; pedicelli calyce longiores; petiolus nudus; foliola 3-4 juga, elliptico-oblonga, apice acuminata, utrinque glabra, venulosa, sessiles, 9-20 cm. longa; umbellæ longiuscule pedunculatæ, pedunculi tomentelli; pedicelli 5-8 mm., calyc. 4-6 mm., corolla 10 mm. longa; legumen ignotum. Junction of the Rivers Beni and Madre de Dios (990). This is nearest to *I. quaternata*, Pœpp. & Endl. but has much larger leaflets and less woolly flowers.

Inga, probably undescribed; collected only in fruit. Junction of the Beni and Madre de Dios (993 and 2375). Some flowers of *I. edulis*, Mart. were accidentally distributed with No. 993.

Inga, related to *I. nobilis*, but with thin membranaceous leaves and simple inflorescence. Mapiri, 2,500 ft. (1001). This is most likely an undescribed species.

ROSACEÆ.

Licania Benthami, Hook. f. in Mart. Fl. Bras. xiv. (2) 12. Junction of the Madre de Dios and Beni (2420). The same as Spruce No. 3278.

LICANIA PALLIDA, spec. nova. Folia oblonga, utrinque pallida et glabra, 10-12 cm. longa, 5 cm. lata; petiola crassa, 1 cm. longa; paniculæ terminales et axillares; ramulis, bracteolis, pedunculis calicibusque albo-pubescentibus; flores spicati;

spicæ 3-4 cm. longæ, 8mm. latæ; pedunculi 2 mm. longi; bracteolæ longiores; stamina sub 5, exserta, petala longiores; fructus ignotus. Junction of the Beni and Madre de Dios (2442). Apparently nearest to *L. polita.*

Hirtella Americana, Aubl. Guian. i. 247. Guanai, 2,000 ft. (702); Mapiri, 5,000 ft. (704). Junction of the Beni and Madre de Dios (1371). A widely diffused and variable species.

Hirtella bullata, Benth. in Hook. Journ. Bot. ii. 216. Reis, 1,500 ft. (703). The same as Spruce No. 3084, Herb. Kew.

HIRTELLA BURCHELLII, spec. nova. Flores in paniculas angustas dispositi; paniculæ rufo-villosæ, angustæ, axillares terminalibusque, 12-20 cm. longæ; ramulis rufo-villosis; foliis ovato-oblongis, acuminatis, basi rotundatis, utrinque nitidis, supra lævis, subtus ad nervos parce villosis; pedunculis 2mm. longis calicibusque dense villosis. Beni River (1222). The same as Burchell's Nos. 6331, 6416 and 6571, Herb. Kew. Nearest to the preceding species.

Hirtella triandra, Sw. Prodr. 57. Reis, 1,500 ft. (1448).

Hirtella bracteata, Mart. & Zucc. Abhand. Akad. Munch. x. 384? Guanai, 2,000 ft. (2492). Specimens insufficient for certain determination.

Couepia glaucescens, Spruce in Mart. Flor. Bras. xiv. (2) 49. Falls of Madeira, Brazil (2678).

Prunus salicifolia, HBK. Nov. Gen. iv. 241. Near La Paz, 10,000 ft. (480).

Quillaja Saponaria, Mol. Chil. 354. Sorata, 8,000 ft. (728).

Rubus megallococcus, Focke, Abhand. Nat. Gesell. Bremen, iv. 157. Unduavi, 8,000 ft. (470 and 472). The same as Mandon's 662.

Rubus Boliviensis, Focke, l. c. 158. Same locality (468). Distributed as *R. Sellowii*, C. & S.? The same as Mandon's 656.

Rubus Bogotensis, HBK. l. c. vi. 220. Unduavi, 8,000 ft. (474). Possibly this may be an extreme form of *R. floribundus.*

Rubus roseus, Poir. Dict. vi. 237. Unduavi, 8,000 ft. (473 and 469). The same as Mandon's Nos. 659 in part and 661.

Rubus glaucus, Benth. Pl. Hartw. 173. Yungas, 6,000 ft. (471).

RUBUS RUSBYI, spec. nova. Ascendens; tomentosus; folia integra, petiolata, serrata, utrinque tomentosa; stipulis latis, ovatis; ramulis, petiolisque minute recurvo-aculeatis; floris solitariis, 2 cm. latis; sepalis ovatis, acutis, 8 cm. longis, dense tomentosus. Planta 50 cm. alta; folia 4 cm. longa, 2 cm. lata. Next to *R. Loxensis*, Benth. - Unduavi, 10,000 ft. (2508).

Fragaria Chilensis, Ehrh. Beitr. vii. 26. Near La Paz, 10,000 ft. (479).

Alchemilla aphanoides, Mutis in Linn. f. Suppl. 122. Unduavi, 8,000 ft. (851).

Alchemilla hirsuta, HBK. l. c. 226. Sorata, 13,000 ft. (477).

Alchemilla tripartita, R. & P. Fl. Per. i. 68. Unduavi, 10,000 ft. (476); 8,000 ft. (849 and 850, the latter a large, strong form).

Alchemilla pectinata, HBK. l. c. 226. Unduavi, 10,000 ft, (475).

Alchemilla pinnata, R. & P. l. c. 69. Near La Paz, 10,000 ft. (2551).

Alchemilla, probably a reduced form of *A. hirsuta*. Sorata, 13,000 ft. (1855). The same in Herb. Kew, coll. by Jameson in Columbia.

Acæna ovalifolia, R. & P. l. c. 67. Unduavi, 8, 000 ft. (467).

Acæna cylindrostachya, R. & P. l. c. 68. Near La Paz, 10,000 ft. (466).

Poterium Sanguisorba, L. Sp. Pl. 1411. Near La Paz, 10,000 ft. (1926). Introduced from Europe.

OSTEOMELES PERNETTYOIDES (Wedd.) (*Hesperomeles pernettyoides*, Wedd. Chlor. And. ii. 231). Sorata, 8,000 ft. (1787). Unduavi, 10,000 ft. (2039).

SAXIFRAGEÆ.

Escallonia rubra, Pers. Ench. i. 235. Valparaiso, Chili (1024).

Escallonia revoluta, (R. & P). Pers. l. c. Same locality (487 and 1772).

PHYLLONOMA INTEGERRIMA (Turcz). (*Dulongia integerrima*, Turcz. Bull. Soc. Moscou, 1858, 454). Mapiri, 5,000 ft. (2521). A form with serrate leaves. I am obliged to Mr. N. E. Brown for putting me on the track of this plant.

Weinmannia hirtella, HBK. l. c. 56. Mapiri, 10,000 ft. (2040).

Weinmannia elliptica, HBK. l. c. 50. Yungas, 6,000 ft. (535); Unduavi, 8,000 ft. (536). Some of these specimens were distributed as *W. subsessilifolia*, R. & P.?

Ribes albiflorum, R. &. P. Fl. Per. iii. 12. Unduavi, 8,000 ft. (478).

HALORACEÆ.

Gunnera scabra, R. & P. l. c. t. 44. Unduavi, 8,000 ft. (624).

COMBRETACEÆ.

Combretum Jacquini, Griseb. Fl. Brit. West Indies, 275. Junction of the Beni and Madre de Dios (721).

Combretum Lœflingii, Eichl. in Mart. Fl. Bras. xiv. (2) 110. Guanai, 2,000 ft. (622), and (2635?) the latter in fruit only.

Combretum Aubletii, DC. Prodr. iii. 19. Beni River (1773).

Combretum, sp. undetermined. Guanai, 2,000 ft. (623).

MYRTACEÆ.

Eucalyptus capitellatus, Sm. Bot. Nov. Holl. 42. Near Valparaiso (600). Cultivated.

Calyptranthes, a species near *C. Spruceana*, Berg. Guanai, 2,000 ft. (1226). Not at Kew, and perhaps undescribed. Collected only in fruit.

Psidium pomiferum, L. Sp. Pl. 672. Beni River (2083).

Psidium polycarpon, Lamb. Trans. Linn. Soc. xi. 231. Yungas, 4,000 ft. (2460).

Psidium, sp. Falls of Madeira, Brazil, (2084).

Psidium aromaticum, Aubl. Guian. i. 485. Falls of Madeira (2085). Compared with Schomburgh's No. 355, Herb. Kew, and appears not distinct.

Myrtus microphylla, Humb. & Bonpl. Pl. Æquin. t. 4. Sorata, 10,000 ft. (2042).

Myrcia lanceolata, Camb. in St. Hil. Fl. Bras. Merid. ii. 236. Yungas, 6,000 ft. (605 and 1447).

Myrcia Selloana, Berg in Mart. Flor. Bras. xiv. (1) 197. Falls of the Madeira (585); Junction of the Beni and Madre de Dios, (592) and 586).

Myrcia velutina, Berg, l. c. 182. Falls of the Madeira (590).

Myrcia Paivæ, Berg, l. c. 179. Yungas, 4,000 ft. (598). The same as Spruce No. 486.

Myrcia anacardiæfolia, Berg, Gardn. Lond. Journ. Bot. ii. 354. Falls of the Madeira (2683).

Myrcia Berberis, DC. Prodr. iii. 254? Falls of the Madeira (587).

Bibliographical Notes on well known Plants.—X.

By Edward L. Greene.

RHUS CANADENSIS, Marshall, Arb. 129 (1785).
Rhus aromatica, Ait. Hort. Kew. i. 367, and
Rhus suaveolens, Ait. l. c. 368 (1789).
Betula triphylla, Thunb. Diss. Betul. 12 (1807).

Although Marshall's descriptions are never clearly diagnostic, still, in the case of this *Rhus* it would seem as if no American botanist could doubt for a moment what bush the man had in view. But the name has always been placed in the synonymy of *R. aromatica* sometimes with,—as often without—a mark of doubt. At the time of his writing there was no other known North American shrub to which his description would apply; and there is no excuse for our continuing to employ the later name *R. aromatica.* Thunberg's grave error in referring the bush to the genus *Betula*, is not more remarkable than that of his master Linnæus, when the latter, as some critics assure us, first published his *Rhus typhina* as a species of *Datisca* (*D. hirta*, Linn. Sp. Pl. 1037).

That Aiton's *R. aromatica* and *R. suaveolens* are one and the same species has long been admitted on all sides; the two names are about equally good, and the uniform retention of the first rather than the second is one of many cases in which authors have, with one consent, recognized the principle of priority of place.

There was an earlier *Rhus Canadensis* of Philip Miller, and this, in days long past, may have stood with some people in the way of the adoption of that of Marshall. But Miller's name is conceded to be a synonym either of *R glabra* or *R. typhina.* It was a pinnate-leaved species, at all events, and a mere synonym, and cannot therefore stand in the way of the restoration of *R. Canadensis*, Marsh.*

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*In the deep cañons of Northern Arizona which lead down to the Grand Cañon of the Colorado, I discovered a few months since an exceedingly interesting shrub which will bear the following name and description:

Rhus Canadensis, Marsh., var. SIMPLICIFOLIA. Shrub 3 or 4 feet high, diffuse, slender; leaves an inch long or less, round-ovate, obtuse, nearly truncate at base, coarsely and somewhat evenly crenate, rarely with a very small lobe or separate leaflet on one side below; spikes few flowered, almost capitate.

RUBUS PARVIFLORUS, Nutt. Gen. i. 309 (1818).

Rubus Nutkanus, Moç. Seringe in DC. Prodr. ii. 566 (1825).

Publication cannot date from drawings, any more than from manuscripts, so long as they remain mere engraver's or printer's "copy;" and the named drawings of Nutkan plants by Moçino passed into publicity by means of the several volumes of the Prodromus; hence Nuttall's name for this widely dispersed western *Rubus* must be preferred in place of that now long in vogue, for it has priority of publication by seven years. When the species first became known there were doubts expressed in various quarters as to its distinctness from the eastern *R. odoratus;* but such doubts no longer obtain, although rose-tinted petals lately observed in some individuals of our western and usually white-flowered shrub, and the fragrance of the flowers, not at first noted, together reassert the close affinity.

Along the Californian coast this *Rubus* takes on a firmer texture of foliage, and therewith an almost velvety vestiture of pubescence,—differences quite sufficient to place it in the rank of a named variety. At first it was even regarded as a valid species (*R. velutinus*, H. & A.) and its name should be *Rubus parviflorus*, Nutt., var. VELUTINUS (H. & A.)

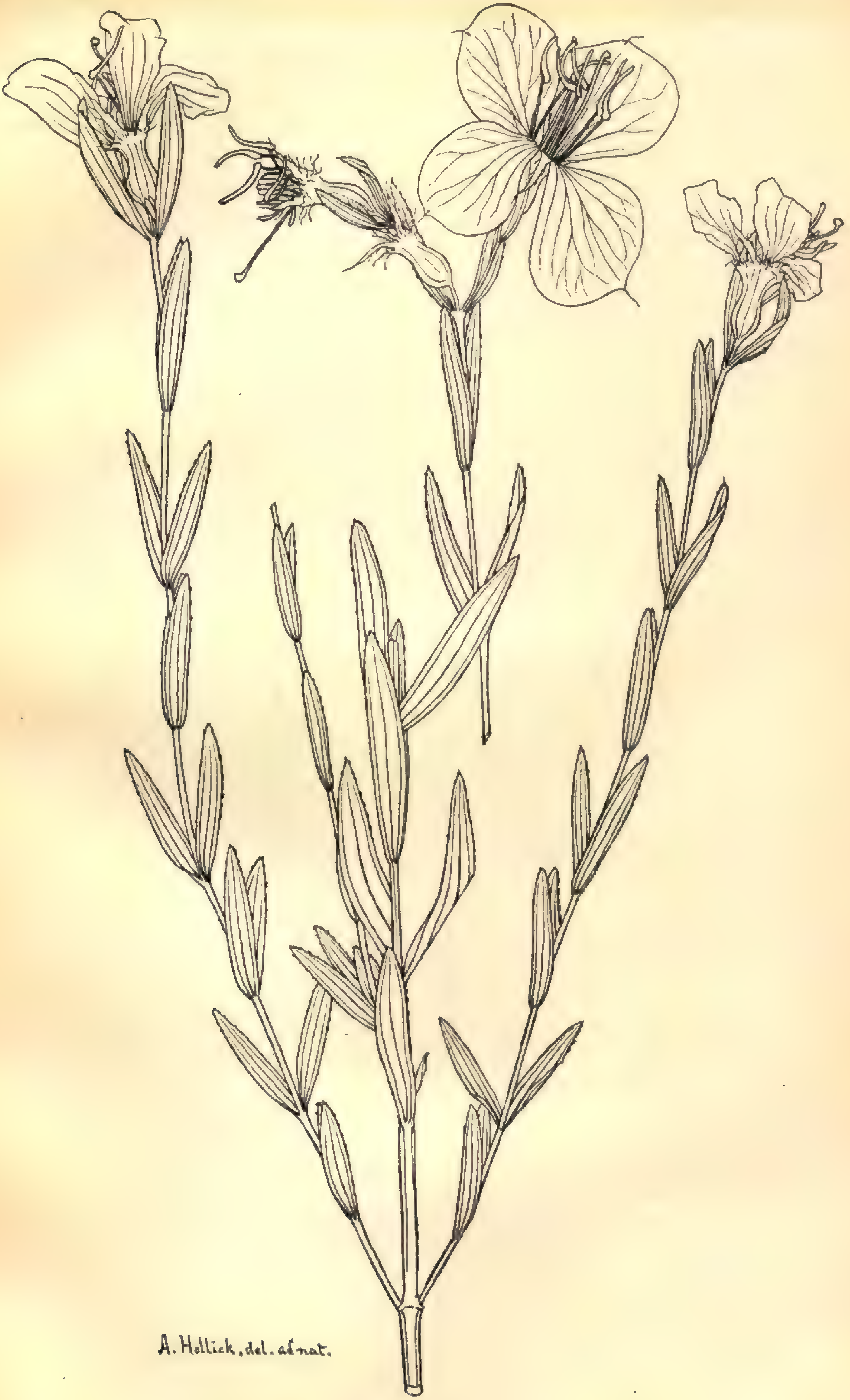
GLEDITSCHIA INERMIS, Crantz, Inst. Rei Herb. i. 219 (1766).

The bibliography of this tree, as given at page 110 of volume xv. of this Journal, must be amended in accordance with the fact that Crantz (not Miller), is the real author of this name.

A New Species of Rhexia.

(Plate XCIX.)

RHEXIA ARISTOSA. Stem square, slender, about 7 dm. high, branching above, entirely smooth; leaves lanceolate-linear and linear-oblong, 2-3 cm. long, 3-6 mm. wide, sessile, erect, obtuse or obtusish at each end, serrate toward the apex with appressed subulate teeth, the lower surface entirely smooth with the three ribs prominent, the upper surface with scattered, subulate hairs and the ribs impressed; flowers 1-3 at the summits of the stem and branches, borne on short peduncles; calyx urceolate, its mouth and linear lobes armed with stiff, yellow, subulate hairs; corolla 4 cm. broad when expanded; petals magenta-red, un-


A. Hollick, del. ad nat.

RHEXIA ARISTOSA, Britt.

equally obovate, rounded but obtusely pointed and tipped with an arista 2mm. in length and clothed with a few scattered hairs; filaments 7 mm. long, equalling the anthers. Fruit not seen.

For this interesting addition to the North American Flora we are indebted to Messrs. E. H. Kilmer and John C. Gifford of May's Landing, Atlantic County, New Jersey, who collected it in August, 1888, at Egg Harbor City. The specimens were communicated to me by Rev. Dr. John C. Peters, an alumnus of Princeton College, who has furnished much valuable information concerning the plants of that portion of the State. It had previously been collected by Capt. John Donnell Smith in Sumter County, South Carolina, and I am indebted to Dr. Watson for a sprig from the specimen preserved in the Gray herbarium. The Egg Harbor plants evidently grew in water, which had, however, dried up at the time of collection. N. L. BRITTON.

New Varieties of Well-Known Species.

ARABIS LÆVIGATA, (Muhl.), Poir., var. BURKII.

Leaves linear or lance-linear, entire or rarely with one or two teeth, not auricled at base; flowers half the usual size; sepals broad, and as long as the petals; seeds wing-margined.

Found first (1852) on the dry hills of Franklin Co., Penn., where it is common, and later (1867) near Harrisburg, by Mr. Isaac Burk.

FRAGARIA VESCA, L., var. AMERICANA, (var. β., Torrey & Gray, Fl. N. Am. 1, p. 148).

Softly villous; leaves thin, becoming glabrate with age, sharply serrate-dentate; scape and peduncles slender; flowers small; fruit ovoid, of a light pink color; surface of the receptacle smooth and shining, not pitted; akenes prominent and barely attached to it.

The European plant is naturalized in many places, but this variety is undoubtedly native. It occurs on cliffs, in wild, shaded ravines, and has been collected at a number of stations in the northern United States and Canada.

RUBUS VILLOSUS, Ait., var. MONTANUS.

More slender and smaller in all its parts; fruit oblong, or conical, like a narrow thimble, sometimes an inch in length, less soft and fleshy and possessed of a peculiar flavor.

Abundant on the higher mountains of New York, New Jersey and Pennsylvania, it goes everywhere by the name of "the mountain blackberry."

ASTER PRENANTHOIDES, (Muhl.), var. LONGIFOLIUS.

Leaves thin, deep green, sharply serrate above the middle, the larger ones 5 to 8 inches in length, narrowly lanceolate, tapering into a long acumination, the contraction below the middle nearly obsolete.

This well-marked variety has been found in Northampton, Delaware and Luzerne Counties, Pennsylvania.

THOS. C. PORTER.

Botanical Notes.

The Missouri Botanic Garden. The provisions of the will of Mr. Henry Shaw, the philanthropic millionaire of St. Louis, have recently been made public, and botanists have every reason to be highly gratified with them. For the whole of his vast estate, representing a present valuation of more than $3,000,000, is left in trust for the support of the gardens which were his delight during the latter portion of his long life-time, and which will thus be supplied with an income second only to that of Kew. This must give a most powerful impetus to the study of botany and horticulture. The great income, it is stated, will probably be materially increased in the appreciation in value of real estate now lying on the outskirts of the city.

Dr. Wm. Trelease, the professor of Botany in Washington University, has been fittingly chosen as Director of this important establishment. His time must necessarily be largely occupied with administrative details, but we hope that these will not altogether interfere with further contributions from his pen towards the elucidation of critical problems in North American Botany.

Reviews of Foreign Literature.

Freie Gefässbündel in den Halmen von Olyra. In a late number of "Flora" is an article by Fritz Müller from Brazil. The author describes the joints of a certain species of *Olyra*, a grass which grows there in dense masses on the boundaries of their forests, as containing free vascular bundles stretched from one end of the joint to the other. The word free is not used here in the ordinary sense of a bundle ending free, but rather the opposite. This bundle is described as a string or thread extending through the joint and, in its perfect condition, adhering at both ends. Sometimes this string is tense, sometimes with coils and spiral windings, forming a snarl of the different threads which nearly fills the cavity. These grasses are said to reach the height of two feet and over, and the length of the joints to vary greatly. The seven lowest joints of one stem are recorded as varying from eighteen centimeters to five-tenths of a centimeter in length. They also vary in regard to the presence of the vascular bundle. No rule could be found regulating the appearance of these strings. They never occurred nearer the growing end of the stem than the fourth or fifth joint, those above these being solid; anywhere else along the stem they were liable to occur.

The upper ones are described as transparent enough to allow their structure to be determined without cutting. The bundle consists of a central annular duct enclosed by two kinds of cells, which are described as long with narrow diameter, the outer ones being thin walled and whose long diameter is about twice that of the other two dimensions.

The author is unable to give any reason for the existence of these threads, neither does he give the manner of their origin, farther than to suggest that their growth does not take place exclusively at the lower end. In conclusion he states that he has sought in vain in the joints of many other grasses for this appearance; also in two other species of this same genus with no result.

E. L. G.

Sur la présence en Anjou de l'Equisetum littorale, Kühlwein, par M. L'abbé Hy. (Bull. Soc. Bot. France, xxxvi, pp. 312-314). Although reputed to be a rare species, *Equisetum littorale*, on account of its habitual sterility, has probably been much overlooked. To distinguish it from *E. arvense* and *E. limosum* with which it ordinarily grows, the following characteristics are given: The central medullary canal is reduced to one-half the diameter of the stem, whereas, in *E limosum* the stems are largely fistulose. From *E. arvense* it may be distinguished by the first internode of the branches surpassing little if any the length of the corresponding foliage. The anatomical characters still further separate them. In *E. littorale* each fibro-vascular bundle or ridge of the stem is encased in a special endodermis, in *E. arvense* a common endodermis surrounds the exterior of the central cylinder.

If *E. littorale* is really as rare as reported its geographical distribution can only be accounted for on the ground of hybridization. Without having direct proof the author is inclined to consider it a hybrid between *E. arvense* and *E. limosum ;* its characters are absolutely intermediate. He agrees with Milde and not with Duval-Jouve in his conclusions.

E. G. B.

Diatomées Fossiles du Japon. J. Brun and J. Tempére. (Reprinted from Memoires de la Société de Physique et d'Histoire Naturelle de Geneve. Tome xxx. No. 9.)

The volume is devoted to the calcareous earths of Sendai and Yedo, and consists of seventy-five pages of text accompanied by nine beautifully executed phototype plates embracing 135 figures. Prof. Brun, of the University of Geneva, has so long been known as a standard authority upon the Diatomaceæ, that this work will be welcomed as a valuable contribution to the literature of the subject. It is worthy of note that some of the species figured occur also in the famous Santa Monica earth. Others are found in the Atlantic City fossil deposit recently described in this journal.

C. H. K.

Index to Recent American Botanical Literature.

Adonis. H. H. Rusby. (Drug. Bull. Nov. 1889, reprinted). Illustrations are given of *A. vernalis*, *A. autumnalis* and *A. æstivalis.*

Algarum ex insula Georgia Australi—Species et genera nova. P. F. Reinsch (Ber. Deutsch. Bot. Gesellsch. vi. 144-156).

New species are described in the genera *Desmarestia*, *Polysiphonia*, *Kalymenia*, *Gracillaria*, *Rhodomenia*, *Delessaria*, *Nito-*

phyllum, Bonnemaisonia, Choreocolax, Ptilota and *Callithamnion.* The following are new genera, each with a single new species: *Chroa, Merenia, Straggaria.* Collected during the German Transit of Venus Expedition, 1882–'83.

Algen—Brazilien Gesammelten, Bearbeitung der von H. Schenck. M. Mobius. (Hedwigia, xxviii. 309-347; t. X. and XI). 64 species (including one *Chara*) are enumerated and novelties described in the following genera: *Spirocoleus; Entophysa,*—a new genus, found in the tissues of *Chara Hornemanni; Acetabularia; Dictyopteris; Gracillaria.*

Bahamas.—The Botany of the. Chas. S. Dolley. (Proc. Acad. Nat. Sci. Phila., 130-134, 1889).

On the occasion of presenting for publication a paper entitled " A Provisional List of the Plants of the Bahama Islands," by John Gardiner and L. J. K. Brace, which we shall hope to notice in these columns as soon as it is issued, Professor Dolley remarked on the general character of the Bahaman Flora and its relation to that of Florida and Bermuda. In this connection we would state that Dr. and Mrs. Northrop are now in Bahama, prepared and equipped to obtain extensive collections of both animals and plants. The club may therefore anticipate hearing some account of this exceedingly interesting flora at no very distant day.

Bald Cypress—The. W. P. Wilson. (Forest Leaves, ii. 110, 111, illustrated). This little article includes a discussion upon the nature and functions of "knees," and the figure of the tree, (*Taxodium distichum*) is an exceedingly good one, reproduced from one of Dr. Rothrock's photographs. The theory that the knees are respiratory organs is maintained.

Cochliostema Jacobianum. (Garden, xxxvi. 477, illustrated).

Color Character—The. Edward L. Greene (Pittonia, ii. 35-46; advance sheets).

Professor Greene shows how stable a character color is in certain great groups of plants, and does not approve of naming albino forms.

Contributions Towards a List of the Fauna and Flora of Wet Mountain Valley, Colorado.—II. T. D. A. Cockerell. West Am. Sci. vi. 134-136).

The monocotyledonous plants of the region are here enumerated.

Croton Alabamensis. C. Mohr. (Garden and Forest, ii. 592, fig. 150).

Desmidieer frau Grönland. Robert Boldt. (Bihang till Kongl-Svenska Vet. Akad. Hand. xiii. Afd. III. No. 5, pp. 48; two plates).

This is a list of Greenland Desmidiaceæ, with localities and descriptions of new species in *Euastrum*, *Cosmarium*, *Xanthidium*, and *Staurastrum.* The plates represent fifty-three of the species and forms enumerated. The paper was noted some months since in the "Botanisches Centralblatt," but this number of the "Bihang" has only recently come to us. It contains also a lengthy tabulation by the same author of the geographical distribution of all known arctic Desmids.

Exotic Fungi—Some. M. C. Cooke. (Grevillea, xviii. 34, 35).

Cintracta Patagonica, from Patagonia; *Dendrodochium verticillatum*, from South Carolina, *Hydnum cretaceum*, *Gnomonia coriacea* and *Micropeltis maculata* are described by Dr. Cooke and Mr. Massee.

Eleocharis—The Genus in North America. N. L. Britton. (Journ. N. Y. Mic. Soc. v. 95-111, reprinted)

Dr. Britton has here given us a critical account of the relationships and synonymy of this somewhat difficult genus, with a careful account of the geographical distribution, and a valuable numerical reference to the chief collections of each species and variety. He finds that 40 species are North American, with 36 occurring in the United States, just "double the number known to Dr. Torrey in 1836." The author's conclusions regarding the value of certain characters in classification are important, and are stated in the following sentence: "I am not unaware that histological details have been invoked in the classification of this natural order, and I have been particularly impressed by the extremely minute and laborious researches of Palla as published in Engler's Bot. Jahrb. x. 293, but as the results reached by him appear to me to destroy natural alliances rather than to ascertain them, I have not used the arrangement of the fibro-vascular bundles of the stem as proposed by him, nor, indeed, have I found it necessary to invoke it."

The paper is the result of studies extending over several years, during which a great number of specimens, both at home and abroad, have been studied. *E. Parishii* is a new species from Agua Caliente, San Diego Co., Cal., No. 1569, Coll. of S. B. Parish.

H. H. R.

Fern Flora of Canada. George Lawson. (Halifax, N. S., 30 pp. small 8vo. illustrated.)

This neat little book is intended for the use of schools, comprising a description of all ferns known to inhabit the Dominion, with localities where they grow. An introductory portion of ten pages is accompanied by illustrations of seventeen genera and will be very helpful to the beginner. Professor Lawson adopts in all cases the oldest specific name, and uses other names than those generally accepted for several genera, notably, *Dennstædtia* for *Dicksonia punctilobula.* On the whole this is an interesting little book and commends itself to those who are interested in the geographical distribution of ferns, and indeed to all lovers of these plants.

E. G. B.

Ghiesbreght, Augustus B. Explorador de Mexico; *Veda y trabajos del Naturalista Belga.* Jose N. Roriosa. (La Naturaleza, i, (2d ser. pp. 211-217).

From this grateful tribute to the fifty years of labor of one who has done so much both botanically and zoologically for Mexico, we learn that Auguste Boniface Ghiesbreght was born in Brussels, March 10, 1810. He studied and practiced medicine in Belgium till 1836, when Leopold I. commissioned him and Linden and Funk to investigate the natural history of Mexico. These three accompanied Henri Galeotti in his ascension of the peak of Orizaba in 1838, and made extensive collections at elevations ranging from 9,000 to 12,000 feet. In 1839 they collected extensively at Tabasco and Chiapas, returning to Belgium once a year for three years with extensive collections. Later Ghiesbreght alone visited the "Northern and Southern States, crossed the Cordilleras three times from ocean to ocean, traversed the great Mesa, and ascended the volcanoes of Colima, Jorullo and Cempoaltepec."

He lived at Teapa from 1855 to 1862, making extensive explorations and collections of living and pressed plants which he took to Belgium. In 1862 he settled at the capital of Chiapas, San Cristobal Las Casas, and made extensive collections of insects, molluscs, orchids, agaves and bromeliads. Many of the latter were transported living to Europe and were described by Lindley in the "Flore des Serres et des Jardins de l'Europe." His collections are scattered through the museums and academies of Belgium, England, France, Switzerland, Germany and Russia.

E. G. B.

Grasses of Mountain Meadows and Deer Parks. F. L. Scribner. (Bull. Agric. Exp. Station, Univ. of Tenn. ii. 59–67, illustrated.

In addition to the material previously given by the author under the title of "The Grasses of Roan Mountain," tables of analyses are here given of several of the grasses mentioned, and a figure of *Danthonia compressa.*

Herbarium and Plant Descriptions Adapted to any Botany. E. T. Nelson (4to., Boston, Allyn & Bacon, 1889, 75 cents).

This is another aid for the ready determination of plants from descriptions, designed to effect at the same time a preservation of the specimen examined. Each plant is assigned four pages. The first contains printed headings to be filled in by the pupil, and the specimen is to be mounted on the third, the folded sheet then serving for a species cover. These sheets are put up in portfolios of fifty.

Hypertrophied Hairs on Ampelopsis. John A. Ryder. (Proc. Acad. Nat. Sci. Phil, Part II. 155, 1889).

Prof. Ryder called attention to certain enlarged hairs on the leaves, petioles and tendrils of the Japanese species.

Leguminosæ novæ vel minus cognitæ Austro-Americanæ. I. P. Taubert. (Flora, lxxii. 421–430).

Sellocharis is a new genus related to *Lotus*, and *S. paradoxa* a single species. *Crotalaria Urbaniana*, *Sesbania oligosperma*, *Æschynomene Riedliana*, *Chætocalyx Ilheotica*, *C. Glaziovii*, *Cranocarpus Mezii*, *Galactia Aschersoniana*, *Camptosema pentaphyllum*, *Rhynchosia Schenckii* are newly described. All are from Brazil.

Neilliæ.—The North American, Edward L. Greene. (Pittonia, ii. 25–31.

Professor Greene reviews the history of these shrubs, discusses their relationship to the Asiatic species, from which he concludes they are not to be generically separated, shows that the genus *Physocarpa* is referable to Rafinesque before Maximowicz and gives us valuable notes on the species, which stand as follows: (1) *N. opulifolia* (L.), S. Wats.; (2) *N. capitata* (Pursh), Greene, which is *N. opulifolia* var. *mollis* of the California botany; (3) *N. monogyna* (Torr.), Greene., the *N. Torreyi*, S. Wats., and whose early name we are glad to see restored, and (4) *N. malvacea*, n.sp. from northern Idaho, a remarkable species, differing from the others mentioned from its non-inflated carpels. Besides these, Prof. Greene suspects a fifth species in the plant of the southern Alleghenies, which has not been much collected.

N. L. B.

New York—Annual Report of the State Botanist, made to the Regents of the University, February 25th, 1889. Chas. H. Peck. (From 42d Rep. Mus. Nat. Hist.; pamph. pp. 48; two plates, Albany, 1889).

Mr. Peck reports on the work done in the botanical department of the State Museum of Natural History during the year previous to this date. 268 species were added to the herbarium, of which 108 were new to it, among them *Hieracium prœaltum* from Lewis Co.; *Pentstemon lævigatus* from near Rome; *Physalis Peruviana* from Manor, L. I.; *Quercus heterophylla* and *Q. Rudkini* from Staten Island; *Sparganium affine* (so called) from the Adirondack Mts. *Setaria verticillata* and *Apera Spica-venti* from Lansingburgh, and *Equisetum littorale* from Oneida Lake, and the rest fungi, of which the usual large proportion (46 species this time) are described as new. Under "Remarks and Observations" we note *Proserpinaca pectinacea* reported from Manor, L. I., a remarkable form of *Solidago nemoralis* with white rays from Elizabethtown, Essex Co.; *Coreopsis trichosperma*, var. *tenuiloba* from Eastport and Patchogue, L. I.; *Arceuthobium pusillum* from several localities in Chenango County, found by Mr. Coville; a new locality for *Epipactis* in Onondaga Co., an additional note on *Trillium grandiflorum*, var. *variegatum*, and other interesting items. Mr. Peck gives also a review of the New York species of *Clitopilus*, a genus of pileate, fleshy fungi, enumerating fourteen species, of which eleven are of his own description. As no references to literature are given, we cannot tell from this document how many of them are described here for the first time. N. L. B.

Pecan Tree—The. Chas. Mohr. (Garden and Forest, ii. 569, 570).

In this article, which is mostly concerned with the economic value of the tree, we are pleased to note that the author has adopted the name *Hickoria Pecan.*

Pelargonium—The Horseshoe. F. L. Sargent. (Pop. Sci. News, xxiii. 181, 182, illustrated).

Pinus Banksiana on the Maine Coast. Edward L. Rand. (Garden and Forest, ii. 579).

A memorandum upon the article published in the BULLETIN of November, 1889, with some additional notes.

River Birch—The. (Garden and Forest, ii. 591, fig. 149).

This plate represents a characteristic group of trees of *Betula nigra* in winter, when destitute of foliage.

Species—New or Noteworthy. Edward L. Greene. (Pittonia, ii. 17-24; advance sheets).

The following are described as new: *Aster brickellioides*, var. *glabratus*; *Aplopappus Bloomeri*, var. *Sonnei*; *A. cruentus*; *Grindelia Hendersoni*; *Petasites nivalis*; *Senecio Franciscanus*; *S. ionophyllus*; *S. Gibbonsii*; *Layia hispida*; *Eriophyllum tanacetifolium*; *Prenanthes stricta*; *Mimulus Scouleri*, var. *cæspitosus*; *Eunanus angustifolius*; *Collinsia stricta* and *Monardella discolor.* Many of these were collected by Professor Greene during his exceedingly successful journey of last summer. There are also critical notes on *Scorzonella borealis*, *Malacothrix altissima*, *Mimulus Scouleri*, *Eriodictyon Parryi*, *Thalictrum hesperium* (*S. platycarpum*, Greene) and *Astragalus anemophilus*, with which is joined *A. Miguelensis.*

N. L. B.

Thismia Glaziovii—Une nouvelle Phanérogame sans Chlorophyll. V. A. Poulsen. (Revue Bot. i. 549, 550).

A preliminary note on a new saprophytic species of Burmanniaceæ, little more than two inches in height, from humus in a

Brazilian forest. An anatomical study of this interesting plant will soon be published.

Trinidad.—Annual Report on the Royal Botanic Gardens for 1888. J. H. Hart. (Pamph. 4to. pp. 41, Gov. Printing Office, Port of Spain, 1889).

Unifolia.—Geographical Distribution of Western. Edward L. Greene. (Pittonia, ii. 31-35; advance sheets).

Evidence is adduced to show that *U. sessifolium* has not been found east of the Coast Range, and that *U. stellatum* actually crosses the continent as does *U. racemosum.* More fruiting specimens are called for.

Yucca elata. (Garden and Forest, ii. 568, flg. 146).

Proceedings of the Club.

The regular meeting of the Club was held at Columbia College, Dec. 10th, the Vice-President in the chair and twenty-two persons present.

An Amendment to the Constitution was adopted, making the regular meetings of the Club twice a month. The announced lecture of the evening "Fungus Diseases of the Cranberry," by Professor Byron D. Halsted was then delivered. The substance of his remarks was as follows:

The minute, red galls upon the cranberry leaves, stems, flowers and fruit, are caused by a unicellular fungus known as *Synchytrium Vaccinii,* Th. It is probably at present confined to the Marian Bog, near Brown's Mill, Burlington County, New Jersey. The following additional members of the Ericaceæ are hosts to this gall fungus: *Rhododendron viscosum, Kalmia angustifolia, Clethru alnifolia, Cassandra calyculata, Gaylussacia resinosa* and *Gaultheria procumbens,* in all of which the fungus-bearing cell of each gall is much alike, but in the galls themselves there is a wide variation upon the different hosts. These plants are infested only when within reach of the bog water and above the high tide or flood mark no galls are to be found. In a portion of the bog, cut off by a railroad grade with no waterway through it, there were no galls. The upper portion of the bog is upon two streams which join near its middle.

Up one of these streams no galls could be found, while along the other there was an abundance. It seems clear that the first point attacked was upon the latter stream, and the disease has spread with the water. It was found upon vines for miles below the bog in question, and doubtless would ruin other bogs below this one if there had been any to infest. The gall fungus is fond of much moisture and probably would be checked by leaving the bog dry through the winter and preventing, if possible, floods in spring. The bog is now almost worthless and picking was confined to those areas not bathed by the contaminated water. The cheapest, quickest and most thorough treatment would be to burn the diseased vines and start again. As several related plants along the shore of the bog are also affected, it is evident that these also must be destroyed.

The so-called "cranberry scald" causes the loss of about one-third of the cranberry crop in New Jersey, where it is now mostly confined. The affected berries at first show a soft spot which may spread over the whole fruit and give it a light brown color. Soon after this the berry becomes wrinkled, and small pustules appear, bearing spores. The diseased spot of a berry when first affected is filled with the branching filaments of a fungus. The whole diseased plant abounds in these threads and upon the leaves at least two kinds of spores are formed, one pycnidial and the other ascosporous. The fungus causing the scald has not been fully determined, but it is in many respects closely related to *Physalospora Bidwellii*, which causes a somewhat similar decay of the grape known as the black rot.

The thanks of the Club were extended to Prof. Halsted for his interesting and instructive address.

Dr. Britton exhibited a set of thin cross sections of North American woods, mounted for lantern slides, prepared by Mr. Romyn B. Hough, of Lowville, New York, and remarked on the beauty and value of the preparations.

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Plant Notes from Tadousac and Temiscouata County, Canada.

By John I. Northrop and Alice B. Northrop.

The little village of Tadousac is beautifully situated at the junction of the Saguenay and the St. Lawrence. The latter river here forms quite a deep bay, on the curving shores of which stands the main part of the village, while on the jutting rocky point that separates the bay from the mouth of the Saguenay, are the picturesque cottages of the French fishermen and half-breeds. Just south of the village the banks become very steep and here, far above the present beach, are two, and in some places, three very fine terraces, stretching around the point of the bay and for some distance down the St. Lawrence. Back of all rise the lofty hills of the Saguenay. Our first walk was out on the headland at the mouth of the latter river,and here, at the level of the sea, we found many of the alpine plants of Mt. Washington; among these were *Potentilla tridentata*, *Euphrasia officinalis* and *Vaccinium Vitis-Idæa.* Great mats of *Empetrum nigrum* grew on the rocky banks and beautiful Campanulas nodded from the crevices. We were interested in observing that here *Campanula rotundifolia* bore only a single flower at the summit, and resembled but slightly the large and many-flowered plants, two feet in height, that we had collected in Crawford Notch, and also very different apparently from the little blue bells, three inches high, that grow near the Lake of the Clouds on Mt. Washington, and bear but a single *erect* flower, of a very dark blue color.

We found much the same difference in the forms of *Euphrasia officinalis.* We had first collected it a few weeks previous, near Oakes' Gulf on Mt. Washington, and there, though mature, it was so tiny that in order to find it we had literally to get down on our hands and knees, and go over the ground inch by inch. At Tadousac we collected the usual small bushy Canadian form and a week or two later, at Lake Temiscouata, found some specimens about 8 inches high. Besides this alpine flora, there were many maritime plants. *Plantago maritima* and *Triglochin maritimum* were common, *Tissa salina* grew on the tide flats, and *Lathyrus maritimus* over the rocks on the beach. But most beautiful of all were the great spreading clusters of *Mertensia maritima*, with its graceful trailing branches, glaucous foliage, and showy blue flowers.

Higher up on the rocks were great patches of *Kalmia angustifolia*, making masses of pink bloom; with these grew *Ledum latifolium* and *Cassandra calyculata*, both in fruit, while shading these tangled thickets, were *Pinus Banksiana*, the white spruce, and the black spruce. Trailing over the rocks we found *Juniperus Sabina*, var. *procumbens*, in fruit, and the prostrate variety *alpina* of *Juniperus communis.*

The yellow blossoms, and curious inflated pods of *Rhinanthus Crista-galli* were common near the shore, and in the wet grassy spots *Microstylis unifolia* grew plentifully. Along the Saguenay we collected *Ranunculus Cymbalaria*, and in the crevices of the rock *Aspidium fragrans* was found growing in large tufts, still holding last years leaves, and *Corallorhiza innata.* Here we also collected *Comandra livida* and *Goodyera repens.*

On the border of a small pond near Tadousac, *Polygonum amphibium* was found and in the bogs near the shore we saw *Eriophorum gracile*, and with it the purple-flowered *Potentilla palustris;* also *Calla palustris*, but the flowers had already gone and we could only get the fruit. Although it was the last week in July, we noticed that the little birches on the hillsides near Tadousac had begun to turn yellow, showing that the brief northern summer was already on the wane.

A sail of three hours brought us to Riviere du Loup, and the next morning we botanized along the banks of the rapid flowing stream that gives the town its name. In one place it makes a plunge of about 40 feet over the edges of the dark slaty rock which forms its bed, and here under the hemlocks we found *Moneses uniflora*, the bright blue berries of *Clintonia*, *Coptis trifolia* and *Halenia deflexa.*

Our train left Riviere du Loup about noon, and we were soon speeding towards Lake Temiscouata, some fifty miles to the southeast. At first poplars, birches and spruces were plenty, but as we neared the lake we passed through great swamps of *Thuja* *occidentalis*, some of the trees being the largest we had ever seen. In the cleared places were large patches of *Cnicus arvensis*, *Epilobium spicatum* and great masses of the gorgeous yellow heads of *Sonchus arvensis*, while in places *Vicia Cracca* covered the grass and low shrubs with a mantle of blue. After a ride of nearly three hours, we alighted at our destination, the little village of Notre Dame du Lac, prettily situated on the curving shore of Lake Temiscouata.

Two lists of plants from this region have already appeared in the BULLETIN, the first by John I. Northrop, in November, 1887, the second by Henry M. Ami, in May, 1888.

On my previous visit, in one place near the shore, I collected an exotic labiate, which was not determined as the specimen was in fruit, but this year we found the same species, now evidently well established and holding its own in a dense growth of *Galeopsis Tetrahit* and *Amarantus*. It has curious one-sided spikes of blue flowers, and a peculiar lemon-like odor. We sent some specimens to Dr. Britton, who wrote in reply that it was *Elsholtzia cristata*, a native of Siberia, and belonged near our genus *Collinsonia*. We found it growing in a clearing near a mill, and there is no doubt but that it has been introduced. Still, there are no records of its ever being cultivated, and how it reached this out-of-the-way spot is a mystery.

Near by on the banks of a brook, *Listera convallarioides* grew abundantly and on the hillside above we found a few specimens of *Pyrola chlorantha*. Great beds of *Cornus Canadensis* grew here, as almost everywhere in Canada, and we noted that here, as elsewhere, we could not find a *single four-leaved* plant that bore a flower. We had been struck with this fact while botanizing in the White Mountains, and had made it a special point of observation all summer, but out of the hundreds of plants which we examined not one exception did we find to this rule.

One day we took our canoe and paddled some three miles down the opposite shore of the lake and here, growing among the moss along a little brook, we found the rare *Selaginella spinosa*, looking very much like a delicate *Lycopodium*. Farther up the lake on the way to Mount Wissick we found a number of plants of *Equisetum littorale*. The specimens have since been carefully examined and compared with those so named by Dr. Morong and they are undoubtedly the same species. On our way to Mount Wissick we passed over a shallow portion of the lake and a better place to collect water plants could not readily be found. The bottom was in some places gravelly and in others of sandy clay. The water was beautifully clear, but two or three feet in depth. We found here five *Potamogetons: P. pectinatus*, *P. gramineus*, *P. amplifolius*, *P. natans and P. perfoliatus*, the delicate *Ranunculus aquatilis*, var. *trichophyllos*, and two species of *Chara*. Here and there the spikes of the great Bulrush, *Scirpus lacustris*, rose six or seven feet above the surface of the water.

Most beautiful of all were the *Myriophyllums;* one of these, *verticillatum* grew near our camping place in great masses and we could look down into the clear water and trace the long, feathery unbranched stems until they reached the sand, some seven or eight feet below.

Another species, more slender and growing in much shallower water, we have since determined as *Myriophyllum alterniflorum*. Attention has been called to this interesting species by Dr. Morong in a previous number of the BULLETIN, (xiv. 51.) where he states that it has been found in Lake Memphremagog, Canada, by Mr. J. R. Churchill, but previously had been collected no nearer to us than Greenland.

Well pleased with our morning's spoils, we paddled on a mile or so further, until we found a good camping place, when we disembarked and soon started for the top of "la grosse montagne."

Our trail led up through the usual growth of balsam, white spruce, and *Betula papyrifera*; here and there the ledges were luxuriously carpeted with *Cladonia rangeriferina*. Higher up we found dozens of specimens of *Habenaria Hookeriana*, and even more abundant was *Corallorhiza multiflora*. We also found some few spikes of *C. innata*. About 550 feet above the lake we found some plants of *Epigæa repens* (the first we had seen in Canada) surrounded by *Vaccinium Pennsylvanicum*, *Kalmia angustifolia* and *Ledum latifolium*, and shaded by black and white spruces. Among the crannies of the upper ledges we found *Woodsia Ilvensis*, *W. hyperborea*,*Pellæa gracilis* and *Aspidium fragrans*.

The summit was shaded by very fine specimens of the red pine, *Pinus resinosa.* The next day we worked up our plants, collected some fossils from the ledges at the foot of the mountain, and later on in the afternoon started back for Notre Dame du Lac. The few remaining days we spent there were devoted to grasses and sedges—there was not a very great variety of either, however, and their names will be found in the appended list.

The following list contains the plants collected that have not been mentioned in the former lists. Unless otherwise stated the locality is in the vicinity of Notre Dame du Lac.

Ranunculus reptans,
Coptis trifolia.
Nymphœa advena.
Nasturtium palustre.
Silene noctiflora.
Hypericum ellipticum.
Trifolium hybridum.
Astragalus oroboides,
  var. *Americanus.*
Amelanchier Canadensis,
  var. *rotundifolia.*
Chrysosplenium Americanum.
Ribes prostratum.
Myriophyllum verticillatum.
M. alterniflorum.
Osmorrhiza brevistylis.
Heracleum lanatum.
Carum Carui.
Galium asprellum.
Erigeron Philadelphicum.
Gnaphalium uliginosum.
Lobelia Dortmanna.
Epigæa repens, Mt. Wissick.
Pyrola elliptica.
P. rotundifolia.
P. chlorantha.
Hypopitys Monotropa.
Fraxinus sambucifolia.
Veronica serpyllifolia.
V. scutellata.
Verbascum Thapsus.
Mentha sativa.
Elscholtzia cristata.
Apocynum androsæmifolium.
Chenopodium capitatum.
Fagus ferruginea.
Listera convallariodes.
Microstylis unifolia.
Corallorhiza innata.
Goodyera repens.
Habenaria orbiculata.
Trillium erectum.
Juncus nodosus.
J. tenuis.
J. bufonius.
Potamogeton amplifolius.
P. gramineus.
P. perfoliatus.
P. pectinatus.
Carex intumescens.
Carex retrorsa.
C. stipata.
C. tentaculata.
Scirpus atrovirens.
Eriophorum cyperinum.
Dulichium spathaceum.
Eleocharis palustris.
E. ovata.
Phleum pratense.
Agrostis alba.
A. hiemalis,
Deschampsia cæspitosa.
Poa serotina.
Bromus ciliatus.
Agropyrum repens.
Taxus baccata var. *Canadensis.*
Abies Mariana.
Equisetum arvense.
E. limosum.
E. littorale.
E. pratense.
E. scirpoides.

Polypodium vulgare.
Pellæa gracilis.
Aspidium fragrans.
Woodsia Ilvensis. Mt. Wissick.
W. hyperborea, Mt. Wissick.
Botrychium Virginicum, var. *gracile*, Mt. Wissick.
Lycopodium annotinum.
L. lucidulum.
Selaginella spinosa, Lake Temiscouata.

Some Further Notes on the Flora of the Rangeley Lakes.

I have been especially interested in Mr. Johnson's notes on the flora of the Rangeley Lake region published in the October number of the BULLETIN, because some years ago I spent the month of September in one of the camps on Lake Molechunkamunk,—the same lake on which his camp was placed. Our observations were made therefore in much the same region, but at different seasons of the year, so perhaps on this account a few notes of the plants I observed may be a fitting supplement to his statements.

I was too late for grasses, sedges, and orchids, and on my list therefore I find few species, if any, noted. For some reason or other the ferns seem to have been neglected in my collections, perhaps because not abundant, as Mr. Johnson suggests. I find six species of Lycopodium, however, fully as many as could be expected.

In addition to the Ranunculaceæ mentioned I may name *Clematis Virginiana; Thalictrum polygamum; Coptis trifolia; Actæa spicata* var. *rubra*, and *A. alba*. The three species last named were not uncommon in the deep woods.

Two species belonging to the Scropulariaceæ—*Chelone glabra* and *Veronica scutellata*—and four indigenous species of Labiatæ —*Mentha Canadensis*, *Lycopus Virginicus*, *Scutellaria lateriflora*, and *Brunella vulgaris*--were all I found belonging to these families. Thoreau, if I remember rightly, speaks of the monkey-flower (*Mimulus ringens*) as abundant throughout this region, but I saw no trace of it. These two families therefore seem poorly represented, as Mr. Johnson states. Like him, I found no indigenous species of Leguminosæ. I found the Liliaceæ, the Polygonaceæ, the Rosaceæ, the Ericaceæ and the Compositæ all fairly represented for a woodland region. Of the Liliaceæ, *Trillium erectum* and *T. erythrocarpum;* the two species of *Streptopus;* *Clintonia borealis*, were all common. *Lilium Cana-*

dense and *Veratrum viride* were noted on the lake road from Andover. The latter is an extremely common plant in the Andover region further south. Of the Polygonaceæ *Polygonum amphibium* was the most interesting species. It was very abundant in a marshy inlet of the lake. Of the Rosaceæ, *Geum rivale*, *Agrimonia Eupatoria*, *Fragaria vesca*, and *Potentilla Norvegica* were perhaps the most noteworthy herbaceous species. *Rosa lucida* and *R. Carolina* were both common. I should now expect to find *R. nitida* as well. The list of Compositæ is large in proportion to the other lists. The golden rods most noticed were *Solidago latifolia*, *S. lanceolata*, *S. juncea*, and *S. rugosa*; while the asters were fewer in number—*A. macrophyllus*, *A. puniceus*, *A. acuminatus*, and *A. umbellatus* being the most common species. *Eupatorium purpureum* was common, but *E. ageratoides* was rare and local. *Hieracium Canadense*, *H. scabrum*, *Lactuca Canadensis*, and *Prenanthes altissima* were not uncommon among wood plants.

Other plants having more or less interest were *Brasenia peltata*, which fairly choked a small pond in the vicinity; *Sarracenia purpurea*; *Corydalis sempervirens*; *Drosera rotundifolia* and *D. intermedia* var. *Americana*; *Hypericum ellipticum* and *H. mutilum*; *Impatiens aurea*; *Sium cicutæfolium*; *Cicuta bulbifera*; *Aralia racemosa*; *Galium asprellum*; *Houstonia cærulea*; *Lobelia Dortmanna* and *L. inflata*; *Utricularia cornuta*; *Apocynum androsæmifolium*; *Sparganium simplex*, and *Sagittaria variabilis*. Many of these Mr. Johnson probably observed as well. I agree with him when he mentions the apparent paucity of species—for my list includes a little less than two hundred—but am sure that both his list and my own might be much increased by a longer search. There are many small bogs and marshy ponds that would doubtless yield many species of water plants if any one took the pains to explore them. While the deep-wood flora is not of great variety, yet certain species must be present that could be found by careful search.

On the mountains in the neighborhood some interesting plants must occur. The only one I recall is *Arenaria Grœnlandica*, which I found on Mount Aziscoos, and which is also reported on Bald Pate Mount, near Andover, by the Rev. J. W. Sture.

In the small clearings and settlements on the lakes a number of weeds and other introduced plants have appeared. This was an extremely interesting part of the flora to me, and I therefore made as full a list as possible of the species observed. The invading army was then small in number and few in species, but is likely here as elsewhere to more than hold its own as long as the clearings are open to the sun. I mention a few of these invaders to show how our common weeds travel in the footsteps of man:—*Ranunculus acris*; *Capsella Bursa-pastoris*; *Stellaria media*; *Spergula arvensis*; *Trifolium pratense*, and *T. repens*; *Sedum Telephium*; *Achillea Millefolium*; *Chrysanthemum Leucanthemum*; *Taraxacum officinale*; *Tanacetum vulgare*; *Cnicus arvensis* and *C. lanceolatus*; *Plantago major*; *Galeopsis Tetrahit*; *Polygonum Persicaria*; and *Rumex Acetosella*. All these species were collected at the Upper Dam, except *Spergula arvensis*, which was seen only at Indian Rock, some miles farther north. Most of them, however, appeared as well in other inhabited clearings, and often about the logging camps in the woods.

I have not spoken of the trees and shrubs, for the species observed were those that any one would expect to find in the northern woods. The whole region is much devastated by the lumbermen, and little pine have they left behind them. The poplar and the spruce are now being attacked, and I suppose in time this country will lose much of the wild beauty that is now one of its greatest charms. EDWARD L. RAND.

Notes on Castilleia.

BY T. D. A. COCKERELL.

These singular plants, with their variously colored bracts and comparatively inconspicuous flowers, are very numerous in the West, and exceedingly variable. In Custer County, Colorado, we have at least three species—possibly more, while each one of these presents interesting varieties or forms. About West Cliff, rather below 8,000 feet alt., one finds in the meadows and on the prairies scarlet and pale yellow species. The scarlet-bracted species, which grows mainly on dry land, is *C. integra*, Gray; the other taller, and with pale yellowish bracts, is *C. pallida* var. *acuminata.** This latter species prefers damper ground, and affords food for certain Lepidopterous larvæ. Leaving the open ground, we may now ascend to about 8,200 feet, where the pine timber begins at the base of the Sangre de Cristo Range. We at once meet with a different form, which is rather like *integra*, but taller and more slender, and otherwise peculiar. Failing to fit it with any known species, I will call it for the present *C. integra* var. *gracilis.*† This is the first sign of increase of altitude, which, added to the effect of the timber, with moisture and shade, has produced this taller form with deeply incised bracts.

Let us now follow up Brush Creek, one of the mountain streams. Up to over 10,000 feet we meet with nothing new, until, on a dry aspen-covered slope, appears a third scarlet-bracted form, *Castilleia linariæfolia*, Benth. *C. integra* var. grows at the same place, and can be distinguished from it at a glance. We will call this *C. linariæfolia* form (a.) *coccinea*, as the species is not always of this color. So we go on higher, and at about 11,000 feet is another stranger—when first I saw it, I did not even guess what it might be. But an examination in the hand, and a comparison with the *C. linariæfolia* I had gathered lower down, soon settled the matter—it was a form ‡ of *linariæfolia* with bright crimson 5-parted bracts. How strange, to find a species abundantly at one altitude, and uniformly scarlet, and to ascend perhaps 800 feet in the same gulch, and find it again—but crimson! It was one of the most striking things in variation I had ever seen, but shortly it was to be outdone in the same genus.

Close to where I had found the crimson *linariæfolia*, I came across a little family of *Castilleias* growing on a space of about two feet square—*C. pallida* forms, evidently. There were three varieties or forms, all intergrading beautifully at that very spot;

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* *C. pallida acuminata* (Pursh), Britt.=*C. pallida septentrionalis*, Gray; Coult. Man. p. 284.

† CASTILLEIA INTEGRA GRACILIS: About 2 feet high, tomentose puberulent: Leaves rather inclined to be scabrous. Stem slender, erect, strong, somewhat tinged with purple. Leaves narrow, lanceolate, conspicuously 3-nerved, entire: lower cauline 58 mill. long and 9½ broad. Bracts tomentose, 3-parted, the divisions (the middle one largest) bright scarlet. Calyx about equally cleft before and behind or rather more before. Galea exerted, shorter than tube of corolla. Lip tricallous. Described from fresh specimens. Willow Creek, Custer Co., Colo., Aug. 3, 1889.

‡ *C. linariæfolia* f. *rosea* f. nov.

though perhaps if one of each had been shown to a botanist who knew nothing of variation in this genus and had never seen the intermediates, he would unhesitatingly have classed them as species. Two of the forms fell under the general definition of *C. pallida* var. *occidentalis*, Gray, having the bracts white-tipped. The first, most like ordinary *acuminata* of the valley, I will call f. *lobata*. The bracts are mostly 3-lobed, pale greenish, white at ends. The upper leaves have lateral lobes. The second may be named f. *tincta*, showing as it does the first indication of crimson-purple in this species. The lip is scarcely half the length of the galea; the bracts are broad, 5-lobed or cut and tinged with purplish. They are white at the ends. The leaves are entire. These two forms, although peculiar enough, are recognizable as varities of *pallida*. But growing with them we have the third, a shorter crimson-purple bracted plant, as different from *acuminata* as can well be—the variety *Haydeni* of Gray. With the intermediate forms growing all together, one can see how *Haydeni* may be really a variety of *pallida;* and yet compare typical *Haydeni* with typical *acuminata* of the valley, and the relation seems almost impossible. One plant tall, with pale bracts and entire leaves—the other small, its inflorescence depresssed, its bracts purple, and its leaves often much divided! It is possible, too, as one must admit, that the supposed intermediate forms *lobata* and *tincta* are really hybrids, which from reversion and variability are different in their characters. Yet *C. linariæfolia* has shown how scarlet may change to crimson without any hybridization being anyway probable, and the variation of *Haydeni* from *acuminata* is after all only the usual variation of species in this genus, carried to extremes. But again, the two forms of *linariæfolia* do not intermix, while *Haydeni* and even *acuminata* itself grow together, which favors the idea of their being distinct as species. At timber line (12,000 feet alt.), *Haydeni* is abundant while *occidentalis* sparingly occurs, and even examples of *acuminata* which I could not distinguish from those of four thousand feet below. Above timber line, the mountain side is beautifully pink with *Haydeni* in wonderful profusion. When I sat down I gathered all I could hold in my hands without moving from my seat, but, unfortunately, when pressed, they lose most

A. Hollick. del.

Aster Torreyi, Porter.

of their natural beauty. On the whole, though *Haydeni* is certainly descended from *pallida*, I think we may call it a species, *Castilleia Haydeni* (Gray), while the *lobata* and *tincta* forms may be doubtfully referred to *occidentalis* × *Haydeni*—if *occidentalis* is not itself the hybrid. I feel exceedingly doubtful about this conclusion, nevertheless, for it seems to imply more free hybridization than is common.

However, hybrids or otherwise, the whole series of Custer County Castilleias shows us very plainly the effect of altitude in this genus. It acts in changing scarlet to crimson or purple, and in dividing the leaves and bracts. At extreme high altitude, dwarfing also is apparent, but this is mainly the effect of want of shelter.

A New North American Aster.

(Plate C.)

ASTER TORREYI. Stem erect, rather stout, apparently 2 to 3 feet high, reddish, puberulent; cauline leaves broadly ovate, tapering to the base, conspicuously veined, and scabrous beneath, sharply serrate, the acute apex and the tips of the serratures apiculate-mucronate; upper ones smaller, inclined to be oblong and truncate at the base; inflorescence corymbose; heads numerous, crowded on the ends of the ascending branches; bracts of the involucre ovate, obtuse, imbricated in several rows, scarious in the center, and green on the tips and along the margins, the inner slightly tinged with purple, woolly-ciliate; rays about 4 lines long; akenes sparsely hirsute.

It belongs to the same group which includes *A. Engelmanni* and *A. elegans*, and has heads of flowers much like those of the latter in all respects, although the involucral bracts are somewhat broader and more obtuse.

The single specimen from which this description is drawn was collected in 1865, by Dr. John Torrey, on a high mountain near Donner Pass, in California. Remaining in his herbarium until now, without a name, it must have been overlooked by Dr. Gray, when engaged in the study of the genus. It consists only of the upper half of the plant, of which a figure is here given, in the hope that the botanists of the Pacific Slope may be inspired to make diligent search for the re-discovery of a species so beautiful and well-marked.

THOS. C. PORTER.

Botanical Notes.

Note on Viola pubescens. In connection with the statement concerning Fall-flowering violets made by Mr. A. J. Foerste, on page 267 of the October number of the BULLETIN, it may be interesting to note the occurrence of these late flowers in *Viola pubescens* as well. In this vicinity a small clump of plants of this species has been flowering with more or less perfect and conspicuous flowers at irregular intervals throughout the summer. To-day (Oct. 17th) I have noticed one of the last of these flowers. It is about one-third the size of the early flowers with color and veining distinct. The upper petals are, however, aborted to mere rudiments, while the lateral petals are reduced in size in proportion to that of the lower petal, and project in line with the sepals, rather than expand. All this agrees well with Mr. Foerste's statement above referred to. EDWARD L. RAND.

Stellaria humifusa, Rottb. On a visit to Little Cranberry Island, south of Mount Desert Island, Me., in August last, while crossing a salt marsh my attention was drawn by the vivid green of a few clumps of a Caryophyllaceous plant of a low and compact growth, with ovate, sessile and fleshy leaves. Examination showed it to be the species above named. This locality is, I believe, the most southern one yet recorded. It is an inhabitant of the arctic seas, frequently occurring on the coast of Labrador. Pringle collected it on the south shore of the St. Lawrence one hunred miles below Quebec (BULLETIN, VI, 366). Macoun quotes it from Anticosti Island, and from wet, boggy places on shore of Lake Mistassini; other observers have seen it, though rarely, in New Brunswick. Prof. Goodale collected it on the northern border of Maine on the St. John's, and now we find it on the *coast* of Maine in lat. 44° 15′. J. H. REDFIELD.

Reviews of Foreign Literature.

The Encasing of Protoplasm in reference to the Function of the Cell Nucleus.

This is the title of an article, by G. Haberlandt, in the Journal of the Vienna Academy of Science, in which some peculiar cellulose growths are studied in regard to their probable connection with the action of the nucleus. Klebs succeeded in dividing the protoplasmic body of the cells of certain plants in two halves, one of which contained a nucleus and the other lacked this. This was done by plasmolytic agencies. Haberlandt undertook to find out whether some such action did not take place in certain cases without artificial agency. The first objects of study were the hairs of different Cucurbitaceæ.

In the short hairs of *Bryonia* leaves it was found that frequently in the process of the secondary cell wall thickening, as it is called in Germany, the protoplasmic body was separated in two halves, about equal. The one contained a nucleus, the other was without one. Now, when new cellulose coats were formed, only that part of the protoplasm containing a nucleus was found to participate in this process. Even when the cellulose ring did not form an entire wall, but grew toward the center of the cell so far as to nearly separate the two portions of protoplasm, that portion containing the nucleus had the power of making a new cellulose coat, so as to entirely encase itself from the other half. Also, in hairs whose whole length was covered by a cell wall of nearly uniform thickness, the protoplasmic body was often separated in two unequal portions, by the part holding the nucleus surrounding itself with one or more cellulose coats. This, he says, is exactly analogous to the process occurring in the bast cells of Asclepiadeæ and Apocynaceæ, as described by Krabbe. He traced the same occurrence in the hairs on the under side of the leaves of *Sicyos angulatus* and *Momordica Elaterium*. The encasing in cellulose does not depend on the size of the protoplasmic body, but on its possession of a nucleus.

In the work referred to by Krabbe, the author compares this process of cell-formation within a cell to the formation of ascospores, and in this later work by Haberlandt this view appears to be fully established. The work of Krabbe was done to prove certain theories in regard to the manner of growth of cell wall, and, as such, deserves a separate review. The work of Haberlandt, on the other hand, has special reference to the action of the nucleus in the formation of new membrane. E. L. G.

Capture of insects by Utricularia.

In the "Berichte der Deutschen Botanical Gessellschaft," is an article by M. Büsgen, on the manner and meaning of the capture of insects by *Utricularia vulgaris.*

Experiments were made by feeding plants 15 centimeters long, containing about 15 leaves each, with 6 bladders, with a certain animal, *Chydorus sphæricus.* About 270 of these were fed each plant, and their progress of growth compared with that of other similar plants equally well provided for, except they were carefully prevented from obtaining animal diet. The results proved that the plants fed with animals grew nearly twice as fast as those which were not able to obtain this food.

The manner in which the animals find their way, unassisted, into the bladders is also described. There is nothing specially new in this except, perhaps, the presence of bacteria on the secreting hairs. The lid of the bladder opens by means of the pressure on its surface, and closes quite suddenly, thus capturing the unlucky animal, and, after its death, bacteria proceed to destroy its remains. E. L. G.

Sur les procédés employés par les Japonais pour obtenir des Arbres nains; par M. P. Maury. (Bull. Soc. Bot. d. France, xxxvi. 290-294.)

The Japanese exhibit of dwarfed plants at the Paris Exposition has attracted a good deal of attention. In this article illustrations are given of *Pinus Japonica* one hundred years old; *Ginkgo biloba*, sixty years; *Cephalotaxus*, ninety years, and *Nandina domestica* seventy years old—each of them in ordinary window pots. The method described is the following: The seeds are sown in very small pots, and the young plants allowed to grow till their roots having absorbed all the earth (toute la terre) which they contain, completely replacing it, and escaping in search of a soil more vast. They are then re-potted to others but slightly larger, and the operation is repeated indefinitely. This practice seems to be the most important of those employed by the Japanese horticulturist. Forced in this way to a slow development, by insufficient nourishment and moisture—for even this is deprived them—the trunk is atrophied. Under these circumstances coniferous trees, especially, remain dwarfed in size. To train them into compact and shapely forms, the branches are bound together by bamboo fibres. E. G. B.

Les Plantes Aquatiques Alimentaires. A. Paillieux et D. Bois.

(Bulletin Bimensuel de la Soc. Nat. D'Acclimatation de France, December 5, 1888).

In this pamphlet of thirty-one pages the authors treat of the following edible plants: *Aponogeton distachyum* and ten other species of the genus; *Ouvirandra fenestralis; Trapa bicornis, T. bispinosa* and *T. natans*, var.; *Nelumbium speciosum* and *N. luteum*; *Euryale ferox; Nuphar multisepalum; Nymphœa Lotus, N. edulis, N. rubra, N. cœrulea* and *N. Rudgeana; Eleocharis tuberosa; Sagittaria sagittæfolia, S. Sinensis* and *Œnanthe stolonifera.* Of these the synonyms and common names are given with a short description and notes on habitat, cultivation, uses and geographical distribution. In many cases they have been cultivated or become naturalized in France, and the information given is full and reliable, in others, it is quoted or is meagre. The authors desire for cultivation specimens of *Sagittaria variabilis.*

E. G. B.

Histoire d'un nouveau Légume. A Pailleux et D. Bois. (Rev. Sci. Nat. Appl., Nos. 12, 13, 1889).

The tubercles of *Stachys affinis*, Bruge, have been introduced into cultivation by M. Paillieux, who considers them the third new vegetable of the century and has done all in his power to create a demand for them in the market under the name of "Crosnes du Japon." They have been used for pickles and salads and are recommended for invalids and those of delicate digestion, because of the large percentage (.76) of hydro-carbons in the form of galactane. The flavor and nature of these rhizomes seems to be similar to that of the artichoke. The plant is native of eastern Asia and known also as *S. tuberifera.*

Index to Recent American Botanical Literature.

Algæ of Maine—The Freshwater. William West. (Journ. Bot. xxvii. 205-207).

One new species, (*Sphærozosma Aubertianum*), and two new varieties, (*Micrasterias pinnatifida*, Ralfs., var. *trigona*, and *Staurastrum angulatum*, W. West, var. *subangulatum*), are described.

Algæ of the West Indian Region—Catalogue of the Marine. Geo.

Murray. (Journ. Bot. xxvii. 237-242; 257-262; 298-305, concluded).

In addition to the catalogue of species, a table showing the distribution and a list of authorities is appended.

Atacama—Botanische Reise nach der Provinz in 1885. R. A. Philippi. (Verhand. Deutsch. wiss. Verein Santiago, 1888, 214-221).

Bald Cypress—The knees of the; a New Theory of their Function. R. H. Lamborn. (Garden and Forest, iii. 21, 22, fig. 4).

The much discussed question as to the function of the "knees" of *Taxodium distichum* here receives another contribution. The author advances the very plausible theory that they serve to strengthen the angle where the roots change their direction from a horizontal to a more or less vertical one. As these roots undoubtedly act in the capacity of anchors to hold the trees steady in the soft and yielding soil where they grow, the above hypothesis seems entirely within reason. The significant fact is mentioned that the Bald Cypress seldom, if ever, is known to be prostrated by the wind, in spite of its apparently insecure place of growth. It is also suggested that the knees may serve the purpose of arresting drift material, and holding it until it decays and becomes food for the roots of the trees to absorb. The author considers the theory that they are aerating organs as yet unsubstantiated.

Bulletin of Miscellaneous Information—Royal Gardens, Kew, 1889. (8vo. pp. 306. London, 1889).

Contains much that is of interest to American botanists. Under the caption Coca are full descriptions, with figures, of *Erythroxlyon Coca* and *E. Coca*, var. *Novo-Granatense*, and brief notes upon other species of the genus. Two memoranda are given upon the Yam Bean (*Pachyrhizus tuberosus*), one of which is illustrated. The short-podded Yam Bean (*P. angulatus*) is also figured. *Zizyphus chloroxylon*, the Jamaica cogwood, is figured, and its bibliography given. Considerable space is occupied by the description of the economic values of *Attalea funifera; Cinchona*, *Agave rigida*, var. *Sisalina*, and several others. In the list of hardy annual and perennial herbaceous plants which have perfected seeds at the Gardens are a large number of our well-known North American species, and the same may be said of their list of newly-introduced garden plants, among which may be noted *Amelanchier alnifolia, A. oligocarpa. Antirrhinum Nuttallianum, Aquilegia longissima, Camassia Cusickii, Convolvulus Californicus, Erythronium Hendersonii, Oxybaphus Californica, Smilax rotundifolia, Vitis indivisa*, etc. Under the heading, "Guide to the Botanical Literature of the British Empire," will be found lists of the works relating to, or in which reference is made to the botany of the British Possessions in the Western Hemisphere—a very useful compilation.

Champignons de Venezuela et principalement de la Region du Haut Orénoque recoltes en 1887 *par M. A. Gaillard.* N. Patouillard and A. Gaillard (Soc. Mycol. France iv. Fasc. 2, 7–46, Pl. VI-XIII; from Bot. Centralb. xxxix. 121).

Chenes de l'Amerique septentrionale en Belgique. J. Houba (8vo. pp. 329, Hasselt, 1887).

Cottonwood. (*Populus monilifera*, Ait.) *Observations on the*, Albert F. Woods. (Bull. No. 11, Agric. Exp. Sta. of Neb. 93-97).

An attempt is here made to differentiate between the male and female trees, by other than the usual sexual characteristics. The tables of observations on times of leafing and defoliation and number of lateral and terminal buds are not devoid of interest, and the entire article shows considerable care in its preparation. but the net results may be best stated in the author's own words, viz.: "There are therefore, no observable secondary sexual characters, and it is safe to say that the sex of cottonwoods cannot be determined until they begin to bear fruit." It should be remarked, however, that the author does not class the appearance and dropping of leaves as a *secondary* characteristic. The fact that the female tree is the last to leaf and the first to drop its leaves, is considered as due to the expenditure of vital force in perfecting its fruit, hence it is a *primary* characteristic! It seems as if considerable latitude might be given to the definition of primary characteristics, and their number be greatly increased under such a ruling.

Cypress.—The Deciduous. (Garden and Forest, iii. 2, Fig. 2).

Contains a discussion of "knees" and other phenomena in connection with *Taxodium distichum*, and a characteristic view of a swamp in Southern Indiana.

December.—A mild. (Garden and Forest, iii. 11).

Several contributions under this heading announce the flowering of plants out of season, from many widely separated sections of the country. Similar communications appear in the following issue, and finally the editors are obliged to say: "We have received many letters, for which we have no further space, from correspondents who give lists of flowers blooming out of their season. But with bluets (*Houstonia cærulea*) flowering by New England roadsides, *Anemone blanda* opening in the suburban gardens of this city, and dandelions starring the turf everywhere the day after New Years, it is safe to pronounce this an exceptional winter."

Economic Fungi.—Announcement and Contents of Fascicle. A. B. Seymour and F. S. Earle. (Cambridge, Mass., January 1, 1890).

The announcement is made that a series of fascicles of fungi of economic importance are to be prepared, to illustrate the diseases of noxious and useful plants. Each fascicle is to be given a distinctive character, and will be prepared either loose or in book form. Fascicle I, containing 50 species, is now ready for distribution, at $3.00 or $3.50, according to method of preparation.

Euphorbiaceous Plants collected by Mr. T. S. Brandegee in 1889 *on the mainland of Lower California and the adjacent islands of Magdalena and Santa Barbara.* C. F. Millspaugh. (Proc. Cal. Acad. Sci. (II), ii. 217-230; reprint, issued December 17, 1889).

In this "Contribution to North American Euphorbiaceæ, I," Dr. Millspaugh enumerates 41 species and varieties, of which the following are described as new: *Phyllanthus Brandegei ; P. ciliato-glandulosus ; Croton Magdalenæ ; Argythamnia Brandegei ; A. serrata*, var. *Magdalenæ ; A. sericophylla*, var. *verrucosemina ; Acalypha Comunduana ; Bernardia viridis ; Euphorbia Purisimana ; E. Brandegei ; E. pediculifera*, var. *minor ; E. conjuncta ; E. involuta ; E. geminiloba ; E. Comunduana ; E. heterophylla*, var. *eriocarpa.* There are also critical notes on

many other species. If this order serves as an index to the rest of Mr. Brandegee's collection, it must be wonderfully rich in novelties.
N. L. B.

Fittonia argyroneura. W. H. G. (Garden xxxvi, 527, illustrated).

Flora of the Northern Shores of America.—Remarks on, with Tabulated Observations made by Mr. F. F. Payne, on the Development of Plants at Cape Prince of Wales, Hudson Strait, during 1886. Geo. Lawson. (Trans. Roy. Soc. Canada; Sec. iv. 1887, reprinted).

In the list of plants collected, numbering 66 species, will be found many which are familiar to all who have collected in the Northern United States and in our eastern mountain regions, such as *Vaccinium Vitis-Idæa, V. uliginosum, Diapensia Lapponica, Pyrola minor, Rhododendron Lapponicum, Salix herbacea, Saxifraga oppositifolia,* etc., and a few which are known at the sea level in our own neighborhood, such as *Cerastium vulgatum, Honkenya peploides, Eriophorum polystachyon* and *Cystopteris fragilis.*

Flowers and Insects. III. Chas. Robertson. (Bot. Gaz., xiv, 297-304).

Notes are given upon the habits and effects of bird and insect visitors upon *Nelumbo lutea, Dentaria laciniata, Geranium maculatum, Impatiens aurea, I. biflora, Staphylea trifolia* and *Ceanothus Americanus.*

Fungi of Economic Interest.—Notes on; Observed in Lancaster County, Nebraska, during the summer of 1889. Roscoe Pound. (Bull. No. 11, Agric. Exp. Sta. of Nebraska, 83-91).

The author states that "the popular idea, and one which one constantly encounters in conversing with those who suffer from the damage done by these fungi, namely, that they are more abundant in wet seasons than in dry ones, has not been confirmed by my observations." Three lists are given, one of injurious fungi, numbering 64 species; one of those which are harmless so far as observed, numbering 5; and one of beneficial fungi, numbering 6. Under the latter heading the intention is evidently to describe the species which are beneficial to economic botany—not to the hosts. Thus "*Botrytis tenella*, Sacc. On "June

Bugs" (*Lachnosterna*) and several caterpillars. Often kills large numbers of them."

Garden Vegetables.—History of. E. L. Sturtevant. (Am. Nat. xxiii. 665-677).

We are pleased to again welcome the author's contributions to this subject. In this paper he treats of the Lima Bean, (*Phaseolus lunatus, L.*), Lovage, (*Ligusticum levisticum, L.*), Mallows, (*Malva crispa*, L.), Marigold, (*Beta vulgaris*, var.), Martynia, (*Martynia proboscidea*, Glox., and *M. lutea*, Lindl.), Melon, (*Cucumis melo*, L.), Mint, (*Mentha viridis*, L.), Mugwort, (*Artemisia vulgaris*, L.), and Mustard, (*Sinapis alba*, L., *S. nigra*, L., *S. brassicata*, L., *S. Chinensis*, L , and *S. Pekinensis*, Lour).

Goniograptus Thureani, McCoy, from the Levis Formation.—Additional Notes on. Henry M. Ami. (Can. Rec. Sci. iii. 502, 503, illustrated).

Grasses and Forage Plants of the United States, and such Foreign Kinds as have been Introduced.—The Agricultural. George Vasey. (Special Bull. Bot. Divn. U. S. Dep't Agric., Washington, D.C., 1889).

This profusely illustrated report begins with an account of the grasses, 99 of which are figured. Amongst the forage plants other than grasses may be noted *Opuntia Engelmanni*, *Erodium cicutarium*, *Eurotia lanata*, besides the *Trifoliums*, *Medicagos*, and other allied plants, all figured. Excellent plates are also given, under the heading "General Description of Grasses," of roots and rhizomes; sheaths, ligules and blades; inflorescence and dissections of flowers.

Hickory Matter.—In the. N. L. Britton. (Garden and Forest, ii. 621, 622). A communication, with editorial comment

Palæontology of the Plains, No. 1—Contributions to the. F. W. Cragin. (Bull. Washburn Coll. Lab. Nat. Hist., ii. 65-68).

Cycadoidea munita is described as a new species, intermediate between *C. megalophylla* and *C. microphylla.*

Relation of the Flora to the Geological Formation in Lincoln County, Kentucky—The. Harry A. Evans. (Bot. Gaz. xiv. 310-314).

This is a contribution along a line of investigation to which too little attention has been paid. The relations between any geological formations and their accompanying floras are of value and are often of unexpected interest. The author is working in a field of research which ought to bring forth good results.

Rusts and Smuts of Nebraska—A Preliminary Enumeration of the. (Bull. No. 11, Agric. Exp. Sta. of Neb., 37-82).

One hundred and nineteen rusts and twenty smuts are enumerated, to which is appended an index to all the host plants mentioned.

Sequoia—The Great. Chas. H. Shinn. (Garden and Forest, ii. 614-615).

The author here gives the early history of the discovery of the "big trees" and the rapid rate at which they are now being destroyed for commercial purposes.

Smut in Oats—Preliminary Report on. (Bull. No. 8, Kans. State Agric. Coll. Exp. Station, Oct. 1889).

Ustilago segetum, (Bull.) Ditm. is described and figured, as is also the striking smut, *Tilletia fœtens,* (B. and C.) Trel. which affects wheat.

Smut of Indian Corn—The. C. E. Bessey. (Bull. No. 11. Agric. Exp. Sta. of Neb., 25-35, figs. 8 and 9).

Ustilago maydis is figured.

Smut of Wheat and Oats—The. J. C. Arthur and Chas E. Bessey. (Bull. No. 11, Agric. Exp. Sta. of Neb., 1-23, figs. 1-7). *Tilletia fœtens* and *Ustilago segetum* are figured.

Station Botanists at Washington—The. Byron D. Halsted. (Bot. Gaz. xiv. 305-309).

This is the report of the Secretary of the Botanical Committee of the Association of American Agricultural Colleges and Experiment Stations, for the meeting held at Washington, D. C., November 12-15, 1889.

Sugar Producing Plants. Wilford Skaife. (Can. Rec. of Sci. iii. 455-475).

An historical account of sugar-making from the earliest times, the plants used and methods employed.

Theobroma cacao. (Le Nat. Canadien, xix. 113, fig. 15).

Ueber Brasilianische Kletterstraucher. H. Schenck. (Verhand. Naturw. Verein der Rheinl., 1889).

Viburnum pauciflorum. C. S. S. (Gard. and Forest, iii. 4 fig. 1).

Wet Mountain Valley, Colorado—Contributions Toward a List of the Fauna and Flora of. T. D. A. Cockerell. (West Am. Sci. vi. 153-155).

In this contribution the author lists thirty-one Algæ, nine Pteridophyta and four Gymnospermæ.

Proceedings of the Club.

The annual meeting was held Friday evening, January 14th, 1890, the Vice-President in the chair, and 21 persons present.

Prof. Byron D. Halsted, Mr. John K. Small, Miss Anna M. Vail, and Mr. F. von Wilmowsky were elected Active Members.

The deaths of Mr. James Hogg and Dr. W. DeForest Day, two of the incorporators of the Club, were announced by the Secretary, and a committee was appointed to draw resolutions expressive of the sentiments of the Club.

Dr. Rusby, on behalf of the Field Committee, read a final report of the season's work.

Mr. Hollick, Secretary of the Botanic Garden Committee, read a report of progress. The Committee was continued.

Reports of the officers were read and accepted. The editors presented the following

SPECIAL REPORT ON THE BULLETIN.

On the completion of the 20th year of publication of the BULLETIN the Editors consider it desirable that a statement of the progress of that journal from its beginning should be publicly made, as well as of its present prospects and needs. While the main facts of its history are familiar to some of the older members to those who have recently come into the Club they will be new and will therefore be of especial interest.

The first number was published in January, 1870, consisting of four pages issued by Mr. William H. Leggett. While bearing the name BULLETIN OF THE TORREY BOTANICAL CLUB, it was actually a private venture on the part of that earnest and enthusiastic botanist, for at that time the Club had no legal organization. Mr. Leggett stated in his salutatory that its object "was primarily to form a medium of communication for all those interested in the Flora of this vicinity and thus to bring together and fan into a flame the sparks of botanical enthusiasm at present too much isolated,

* * * We hope to have no lack of interesting communications, not only from deep investigators, but from all those who meet with interesting facts, for we wish it to be distinctly understood that we have chiefly in view the development of a greater botanical interest in our neighborhood and found our hopes of success as much upon learners as upon the learned. While the BULLETIN will be chiefly devoted to the local Flora of New York, it will not exclude matters of general botanical interest, of which we hope correspondents will keep it informed." The matter of financial support was thus alluded to. "We suppose that we can supply each of thirty subscribers at five dollars a year with ten copies, but must wait for a little experience. If we find it favorably received we are not without hope of ensuring it a permanency, which of course, it ought to have. But of this we purpose to speak hereafter."

A new catalogue of the plants within thirty-three miles of New York was proposed, as well as an herbarium to illustrate it. Both were immediately begun, the first portions of the catalogue being printed in the second number, where the terms of ordinary subscription were fixed at one dollar per annum.

The publication was continued monthly throughout the year, 48 pages completing Volume 1. The result of the experiment is best given in the language of the Editor, as printed in January, 1871. "The present number completes the second year of our publication. The interest shown in it augurs well for its future. Thanks to its friends—some warm ones outside of the Club—it will not fall very far short of paying expenses. When there is a permanent fund of from three to five thousand dollars, as we count there will be some day, it will be insured a permanency. Meanwhile it will be continued at the present rates."

Printing was regularly proceeded with, not with any great financial encouragement, however, for in February, 1872, it was stated "Our expenses for the first two years exceed our income $53. 33." The third volume ran to 56 pages. The Local Catalogue was given greatest prominence, although other matter was beginning to claim space. In January, 1873, the Editor remarked: "THE BULLETIN is now entering upon its fourth year, and we know has been of service in bringing the students of

NEW YORK
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GARDEN.

Botany throughout the country into communication with each other. Our receipts do not yet quite cover our expenses. It is our ambition to enlarge our little publication and make it permanent. To do this there is need of funds. * * An endowment of about $3, 000 would enable us, with our present list of subscribers, to double the number of pages, and perhaps, add some much needed illustrations." The subject was again alluded to in July of the same year, at the time of the final organization of the Club, and again in December. The fourth volume reached about the same size as its predecessors, and the first five volumes were completed in December, 1874.

Meanwhile the Local Catalogue had been extended as far as *Carex*. The difficulty of obtaining correct and reliable reports on the Gramineæ caused its suspension, although the list of Carices and a few grasses appear in the first number of Vol. vi., as a supplement, issued, however, at a long subsequent date. But more general matter was crowding in and there was no lack of it. The next five years were allowed to run on as one volume (Vol. vi.) reaching 379 pages, an average of about 76 pages annually. The publication fund hoped for by its founder was not secured and it is needless to remark that it never has been.

But the object sought by Mr. Leggett had in a large degree been attained. He had "fanned into a flame the sparks of botanical enthusiasm" and excited such a widespread and increasing interest in his loved science that in the increase of subscriptions the BULLETIN could be materially enlarged. Vol. vii. reached 128 pages; Vol. viii., 144 pages. In January, 1882, at the beginning of Vol. ix., the journal was first formally adopted as the organ of the Club, and at the same time the Editor's labors were divided by the election of an associate, Mr. W. R. Gerard, and to him fell the duty of completing that volume alone, for the morning of April 11th witnessed the death of the genial, talented and earnest editor.

Mr. Leggett's services to American Botany have never yet been suitably recognized. It is believed by those who have recently conducted the BULLETIN—and we know that this belief is shared by many others—that this journal was the prime mover in exciting and developing the deep botanical interest which is so prominent a feature in American Science of to-day. It was entirely his creation and the amount of time taken from his busy life and devoted to it can never be fully appreciated. It is his monument, and it should ever be our endeavor to make it a worthy one.

This ninth volume reached 156 pages; Vol. x., ran to 136 pages, and was edited by W. R. Gerard, and N. L. Britton; Vol. xi., by W. R. Gerard and Benjamin Braman, 140 pages; Vol. xii., by the same editors, 136 pages. Meanwhile the number of illustrations had been gradually increasing, and had now become quite an important feature.

Vol. xiii. was edited by Elizabeth G. Britton and F. J. H. Merrill. The style of the journal was here materially changed, a more open type adopted and the number of pages increased to 252. The "Index to Recent American Botanical Literature" was begun, which has since become so important a feature of the BULLETIN. Vol. xiv. was conducted by Elizabeth G. Britton, Jos. Schrenk, F. J. H. Merrill, H. H. Rusby and C. Henry Kain, and reached 268 pages. Vol. xv., by the same staff, with the addition of Emily L. Gregory and the substitution of Arthur Hollick for Mr. Merrill, and ran to 328 pages. Vol. xvi. has been edited by N. L. Britton with the same staff of associates and has reached 340 pages, an average of over 28 pages monthly, or seven times its original number.

This increase in size and importance has been effected solely by the large subscription list. The BULLETIN has never paid for itself, however; there has been a regular shortage of from 6½ to 25%. The present editors believe that it has, however, now reached its maximum size with the present apparent resources, and that unless these are increased no further enlargement can be made for a number of years. But they are faced with an increasing demand for its space, for it has become the most popular organ of botanical publication in America. More illustration is also urgently needed and should be supplied.

Under these conditions there appear to us three alternatives:

1. To continue the publication on the present lines, or perhaps with some retrenchment;

2. To obtain the publication fund hoped for by its founder;

3. To increase its price to subscribers not members of the Club.

We respectfully request that the Club consider these important questions and instruct its editors, for although given power under the Constitution to distribute the publications at their discretion, the responsibility entailed at the present time should not be assumed without further action by the Club.

It was resolved that a committee be appointed by the President to consider the report of the editors, and recommend action by the Club.

The following officers for the ensuing year were elected:—President: Hon. Addison Brown; Vice-President: Thomas Hogg; Treasurer: Dr. W. E. Wheelock; Recording Secretary: Maria O. Steele; Corresponding Secretary: Helena C. Gaskin; Curator: Josephine E. Rogers; Librarian: M. L. Delafield, Jr.; Editor: Dr. N. L. Britton; Associate Editors: Dr. Emily L. Gregory, Prof. Jos. Schrenk, Dr. H. H. Rusby, Prof. C. Henry Kain, and Arthur Hollick.

Mr. Hollick reported *Draba verna* in flower on Staten Island, December 30th, and Dr. Rusby *Erodium cicutarium* in northern New Jersey, Dec. 25th.

The second January meeting was held on the 29th. President Brown in the chair, and 36 persons present.

Mr. Hogg announced the death of Mr. Peter V. LeRoy, one of the incorporators of the Club, and remarked on his botanical work.

The following papers were then read, as announced:—

"Observations on *Utricularia*," by Mr. Bashford Dean.

"Notes on Plants collected in Ontario, Canada, August and September, 1889," by Mrs. Britton and Miss Timmerman.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVII.] New York, March 10, 1890. [No. 3.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XI.

(Continued from page 12.)

Myrcia guajavæfolia, Berg, l. c. 160. Falls of Madeira (596).

Myrcia phæoclada, Berg, l. c. 167. Yungas, 6,000 ft. (599).

Myrcia prunifolia, DC. l. c. 253. Junction of the Beni and Madre de Dios (2693); Falls of Madeira (595), the latter specimens referred here with considerable doubt.

Myrcia sp. near *M. bimarginata*, Berg. Falls of the Madeira (603).

Eugenia Michelii, Lam. Encycl. iii. 203. Unduavi, 8,000 ft. (2082).

Eugenia flavescens, DC. Prodr. iii. 272. Falls of the Madeira (606).

Eugenia Macahaensis, Berg l. c. 589? Falls of the Madeira (588 and 593); Junction of the River Beni and Madre de Dios (597). Compared with Riedel's No. 353, Herb. Kew., and closely related if not identical.

Eugenia Schlechtendahliana, Berg, l. c. 321. Junction of the Rivers Beni and Madre de Dios (594).

Engenia Gardneriana, Berg, l. c. 316. Falls of the Madeira (604). Flowers smaller than in the type.

Eugenia Feijoi, Berg, l. c. 283. Falls of the Madeira (2664).

Eugenia ovalis, Berg, Linnæa, xxvii. 156? Falls of the Madeira (602). Apparently the same as Spruce's No. 5523. Specimens in leaf only.

Eugenia Chequen (Mol.), H. & A. Near Valparaiso, Chili (583).

Eugenia spectabilis, Phil. Linnæa, xxviii. 639. Same locality (584).

Eugenia, sp. Same locality. (601).

Nos. 591 from Falls of the Madeira and 589 from Junction of the Beni and Madre de Dios are probably *Eugenias*, but the specimens are indeterminable.

Lecythis pachysepala, Spruce in Mart. Fl. Bras. l. c. 494. Junction of the Rivers Beni and Madre de Dios (2528).

Gustavia angusta, L. Amoen. Acad. viii. 266. Falls of the Madeira (656).

Gustavia Brasiliana, DC. Prodr. l. c. 290. Junction of the Beni and Madre de Dios (657).

As the species of the order Myrtaceæ have been so exceedingly multiplied by Berg, and many of his descriptions are not represented in the Kew Herbarium, I was unable to distinguish any new species among the numerous specimens collected by Dr. Rusby.

MELASTOMACEÆ.

Acisanthera alsinæfolia (DC.), Tri. Trans. Linn. Soc. xxviii. Falls of the Madeira, Brazil (2534).

Pterolepis trichotoma (Rottb.), Cogn. in Mart. Fl. Bras. xiv. (3) 261. Guanai, 2,000 ft. (2325).

Tibouchina granulosa (Desr.), Cogn. Mapiri, 5,000 ft. (2247). var. ANGUSTIFOLIA, var. nov. Folia anguste oblonga, 8 cm. longa 2 cm. lata, acuta; petiolis 1 cm. longis. Yungas, 6,000 ft. (2245).

Tibouchina barbigera (Naud.), Baill. Adans. xii. 75. Guanai, 2,000 ft. (2326).

Tibouchina longifolia (Vahl), Baill. l. c. 74. Yungas, 6,000 ft. (2336; 2243); Guanai, 2,000 ft. (2244); Yungas, 4,000 ft. (2549), the latter determination from imperfect specimens and uncertain.

TIBOUCHINA PANICULARIS (Naud). (*Chætogastra panicularis*, Naud. Ann. Sci. Nat. (III.) xiv. 129; *Pleroma paniculare*, Triana, Trans. Linn. Soc. xxviii. 46.) Yungas, 4,000 ft. (2327).

TIBOUCHINA CAPITATA (Naud.) Cogn. mss. (*Micranthella capitata*, Naud. l.c. xiii. 350; *Pleroma capitatum*, Triana, l. c.) Mapiri, 2,500 ft. (2727). Det. Cogniaux.

TIBOUCHINA LATIFOLIA (Naud.) (*Micranthella latifolia*, Naud. l. c. 351; *Pleroma latifolium*, Triana, l. c. 47). Yungas, 4,000 ft. (2337); 6,000 ft. (2338).

7 TIBOUCHINA RUSBYI, Cogn. sp. nov. (sect. *Dictanthera*): ramis junioribus petiolis pedunculis calycibusque brevissime et densiuscule hirtellis; foliis breviter petiolatis, oblongis, basi

rotundatis, apice acutis, integerrimis, 7-nerviis utrinque brevissime dense molliterque villosis; paniculis magnis, terminalibus, pyramidatis, multifloris, inferne foliatis; floribus breviuscule pedicellatis; calycis tubo ovoidea lobis triangulari-lanceolatis, obtusiusculis, tubo paulo brevioribus, staminibus valde inæqualibus, filamentis glabris, majorum connectivo basi breviter producto; stylo glabro.

Rami satis graciles, obtuse tetragoni. Petiolus 1-1½ cm. longus. Folia submembranacea, 7-10 cm. longa, 3-4 cm. lata. Pedicelli graciles, ½-1 cm. longi, minute bracteolati. Calycis tubus 5 mm. longus; lobi 3-4 mm. longi. Petala anguste obovata, brevissime ciliata, 8 mm. longa. Staminum filamenta 3-4 mm. longa; antheræ satis arcuatæ, majores 6 mm. minores 3-4 mm. longæ. Stylus filiformis, 10-12 mm. longus. Unduavi, 8,000 ft. (2339).

TIBOUCHINA BRITTONIANA, Cogn. sp. nov. (sect. *Dictanthera*); ramis junioribus pedunculisque brevissime denseque hirtellis; foliis parvis, breviter petiolatis, anguste ovatis, basi rotundatis, apice obtusis, integerrimis, 5-nerviis, supra brevissime denseque strigillosis, subtus brevissime denseque villosis; paniculis majusculis, terminalibus, multifloris, inferne foliatis; floribus longiuscule pedicellatis; calyce brevissime denseque adpresse hirtello, tubo ovoideo, lobis lanceolato-linearibus, acutis, tubo paulo brevioribus; staminibus satis inæqualibus, filamentis glabris, majorum connectivo basi breviuscule producto; stylo glabro.

Rami satis graciles obscure tetragoni, ferruginei. Petiolus 5-8 mm. longus. Folia rigida, cinerea, 2-3½ cm. longa, 8-14 mm. lata. Pedicelli graciles, ½-1 cm. longi, minute bibracteolati. Calycis tubus 5-6 mm. longus; lobi 3 mm. longi. Petala obovata, tenuissime ciliata, 8-9 mm. longa. Staminum filamenta 4 vel 5 mm. longa; antheræ satis arcuatæ, 6 vel 8 mm. longæ. Stylus filiformis, 12-14 mm. longus. Yungas 4,000 ft. (2341).

TIBOUCHINA LANCEOLATA Cogn. sp. nov. (sect. *Dictanthera*); ramis acutiuscule tetragonis, junioribus pedunculis calycibusque setulis brevibus adpressis rigidiusculis sparse armatis; foliis subparvis, breviter petiolatis anguste lanceolatis, basi obtusiusculis, apice acutis, integerrimis, 5-nerviis, supra breviter sparseque adpresse strigillosis, subtus sparse adpressque hirtellis, paniculis brevissimis, paucifloris, floribus brevissime pedicellatis; calycis tubo anguste campanulato, basi acuto, lobis triangularibus, acutis, tubo multo brevioribus; staminibus paulo inæqualibus, filamentis glabris, majorum connectivo breviter producto, stylo glabro.

Rami graciles, purpureo-fusci. Petiolus 2-5 mm. longus. Folia rigidiuscula, 3-6 cm. longa, 7-10 mm. lata. Pedicelli filiformes, basi minute bracteolati, 2-3 mm. longi. Calycis tubus cinereo-fuscus, 4 mm. longus; lobi brevissime ciliati, 1 mm. longi. Staminum filamenta capillaria, 3-4 mm. longa; antheræ subrectæ, 3-4 mm. longæ. Stylus filiformis, 5 mm. longus. Yungas, 4,000 ft. (2343).

TIBOUCHINA STENOPHYLLA Cogn. sp. nov. (sect. *Dictanthera*); ramis obscure tetragonis, junioribus petiolisque setulis longiusculis adpressis rigidiusculis basi tuberculatis sparse armatis; foliis subparvis, breviter petiolatis, anguste lanceolatis, basi subacutis, apice acutis, integerrimis, trinerviis, utrinque sparse adpresseque setulosis; paniculis brevissimis, paucifloris; floribus longiuscule pedicellatis; calyce setis brevibus patulis glandulosis sparse hirtello, tubo oblongo-campanulato, inferne attenuato, lobis triangularibus, acutis, tubo multo brevioribus; staminibus satis inæqualibus, filamentis glabris, majorum connectivo basi longiuscule producto; stylo glabro.

Rami graciles, fuscescentes. Petiolus 3-7 mm. longus. Folia tenuiter membranacea, 3-6 cm. longa, 5-8 mm. lata. Pedicelli filiformes, basi minute bibracteolati, 5-8 mm. longi. Calycis tubus cinereus, 4 mm. longus; lobi ciliati, 1 mm. longi. Staminum filamenta capillaria, 4 vel 5-6 mm. longa; antheræ leviter arcuatæ, 4 vel 6 mm. longæ. Stylus filiformis, 8-9 mm. longus. Capsula ovoidea, 5 mm. longa. Guanai, 2,000 ft. (2323).

TIBOUCHINA PURPURASCENS, Cogn. sp. nov. (sect. *Dictanthera*); ramis obscure tetragonis, junioribus petiolis foliis calycibusque pilis rigidiusculis patulis longiusculis subsparse hirtellis; foliis parvis, breviter petiolatis, lanceolatis, basi subrotundatis, apice acuminatis, obscure denticulato-crenulatis, trinerviis; floribus breviter pedicellatis, solitariis, vel subsolitariis; calycis tubo late campanulato, lobis ovato-triangularibus, apiculatis tubo dimidio brevioribus.

Fruticulus 3-4 dm. altus, ramis gracilibus. Petiolus 2-4 mm. longus. Folia tenuiter membranacea, dilute purpureo-violacea præcipue subtus, 2-4 cm. longa, 6-11 mm. lata. Pedicelli 2-3 mm. longi, ebracteolati. Calyx purpurascens, tubo 4 mm. longo, lobis rigidiusculis, 2 mm. longis. Mapiri, 2,500 ft. (2616).

TIBOUCHINA: sect. nov. OCTOMERIS, Cogn.

Flores 8-meri, pedicellis supra medium bibracteatis. Calycis segmenta persistentia. Antheræ lineares, superne satis attenuatæ, connectivo basi paulo incrassato.

TIBOUCHINA OCTOPETALA, Cogn. sp. nov. (sect. *Octomeris*); ramis junioribus petiolis pedunculisque breviter denseque hirsutis; foliis longiuscule petiolatis, ovato-oblongis, basi rotundatis, apice acutis, integerrimis, 7-nerviis nervis intermediis basi coalitis, supra dense strigoso-hirsutis, subtus breviter denseque villosis; paniculis terminalibus axillaribusque, paucifloris; floribus longiuscule pedicellatis; bracteis subpellucidis, sessilibus, obovato-cuneatis, extus densiuscule breviterque villosis, intus glabris; calyce subadpresse longiuscule denseque striguloso-setoso, tubo subhemisphærico, lobis lanceolato-linearibus, tubum subæquantibus; petalis brevissime ciliatis; staminibus satis inæqualibus, filamentis glabris, majorum connectivo infra loculos breviuscule producto; stylo inferne hirsuto.

Rami robustiusculi, obscure tetragoni, ferruginei. Petiolus 2-3 cm. longus. Folia submembranacea, 1-1½ dm. longa, 5-6 cm. lata. Paniculæ 6 cm. longæ; pedicelli 1-2 cm longi. Bracteæ purpurascentes, adpressæ, circiter 1 cm. longæ. Calyx purpurascens, tubo 8 mm. longo, 10 mm. lato, lobis 7-8 mm. longis. Petala purpureo-violacea, anguste obovata, 1½ cm. longa. Staminum filamenta 8 vel 10 mm. longa; antheræ majores satis arcuatæ purpurascentes 8 mm. longæ, minores subrectæ, flavæ, 6 mm. longæ. Stylus crassiusculus, 1 cm. longus. Yungas, 4,000 ft. (2332).

Brachyotum microdon (Naud.), Tri. l. c. 49. Unduavi, 8,000 ft. (2340).

Aciotis paludosa (Mart.), Tri. l. c. 51. Mapiri, 5,000 ft. (2333).

Aciotis annua (Mart.), Tri. l. c. 52. Falls of the Madeira (2582).

AXINÆA SPECIOSA, Britt. spec. nova. Arbor; foliis 15 cm. longis, 6 cm. latis, oblongis, coriaceis, utrinque acutis, glabris, 5-nervis, integris, supra opacis, subtus pallidis, nervis prominentibus; paniculis terminalibus, decompositis, 12 cm. longis, 10 cm. latis; ramis densifloris; floribus 4 cm. latis, pedicellis

15 mm. longis; calycis tubo 6 mm. diametro, hemispherico, 5-dentato; petalis obovatis, obtusis. Mapiri, 2,500 ft. (2328).

Meriania macrophylla (Benth.), Tri. l. c. 66. Yungas, 6,000 ft. (2329).

MERIANIA BOLIVIENSIS, Cogn. sp. nov. (sect. *Eumerianiæ*); ramis obscure tetragonis, junioribus, petiolis pedunculisque vix furfuraceis; foliis longiuscule petiolatis, anguste ovatis, basi subacutis, apice brevissime et obtusiuscule acuminatis, integerrimis vel vix undulato-denticulatis, 5-plinerviis, supra glaberrimis, subtus vix furfuraceis præcipue ad nervos; paniculis terminalibus axillaribusque, parvis, paucifloris, umbelliformibus; floribus breviuscule pedicellatis, calyce brevissime denseque puberulo, tubo teretiusculo, anguste campanulato, dentibus exterioribus linearibus, tubum æquantibus.

Rami satis graciles, pallide virides. Petiolus 2-2½ cm. longus. Folia tenuiter membranacea, 7-12 cm. longa, 4-6 cm. lata. Paniculæ 4-6 cm. longæ; pedicelli densiuscule puberuli, basi bracteati, 3-5 mm. longi. Bracteæ caducæ, lineares, densiuscule furfuraceo-puberulæ, 1 cm. longæ. Calyx cinereus, tubo 7-8 mm. longo, lobis interioribus ovatis, 3 mm. longis, dentibus exterioribus 6-7 mm. longis. Petala purpurascentia, obovata, 2 cm. longa. Antheræ 4-5 mm. longæ. Stylus filiformis, 10-12 mm. longus. Aff. *M. quintuplinervis* Naud. Yungas, 6,000 ft. (2246).

Adelobotrys adscendens (Sw.), Tri. l. c. 67. Mapiri, 5,000 ft. (2441).

Græffenriedia emarginata (R. & P.), Tri. l. c. 71. Mapiri, 2,500 ft. (2335). A form or variety with very lax inflorescence.

Leandra crenata (Don), Cogn. in Mart. Fl. Bras. xiv. (4) 137. Unduavi, 8,000 ft. (2306); Mapiri, 2,500 ft. (2307).

Leandra aurea (Cham.), Cogn. l. c. 140. Yungas, 6,000 ft. (2304; 2312).

Leandra reversa (DC.), Cogn. l. c. 198. Mapiri, 2,500 ft. (2302).

Leandra dichotoma (Don), Cogn. l. c. 200. Mapiri, 2,500 ft. (2235).

LEANDRA STELLULATA, Cogn. sp. nov. (sect. *Carassanæ*); ramis junioribus petiolis pedunculis foliisque subtus ad nervos pilis patulis breviusculis crispulis apice stellulato-ramosis dense vestitis; foliis longiuscule petiolatis, oblongis, basi subrotundatis, apice acutis, minute denticulatis ciliatisque, leviter 5-plinerviis, supra glabratis, subtus vix furfuraceo-puberulis; paniculis parvis, paucifloris, diffusis, floribus breviter pedicellatis; calyce leviter puberulo, tubo ovoideo, lobis triangularibus, acutis tubo 2-3 plo brevioribus; petalis anguste triangularibus, acuminatis.

Rami graciles, teretiusculi, cinerei. Petiolus 1½-3 cm. longus. Folia membranacea, in eodem jugo satis inæqualia, 6-12 cm. longa, 2½-5 cm. lata. Paniculæ 3-4 cm. longæ, pedicelli basi bracteolati, 2-4 mm. longi. Calycis tubus 2-2½ mm. longus; lobi circiter 1 mm. longi. Petala subreflexa, 1½ mm. longa. Stylus 2-3 mm. longus. Affinis *L. subseriata*, Cogn. Yungas, 6,000 ft. (2311*a*).

Miconia spennerostachya, Naud. l. c. xvi. 187. Guanai, 2,000 ft. (2278). Det. Cogniaux.

Var. ANGUSTIFOLIA, Cogn. Folia oblonga, breviuscule acutique acuminata, 12-18 cm. longa, 4-6 cm. lata. Mapiri, 5,000 ft. (2268).

MICONIA PERSICARIÆFOLIA, Cogn. sp. nov. (sect. *Eumiconia*, A. Aplostachyæ, Fl. Bras.); ramis teretiusculis, superne vix compressis, junioribus petiolis pedunculis calycibusque densiuscule stellato-furfuraceis; foliis breviter petiolatis, anguste lanceolatis, longe acuminatis, basi acutiuscule attenuatis, integerrimis, trinerviis, supra glabris, subtus ad nervos nervulosque densiuscule stellato-puberulis, cæteris glabratis; paniculis spiciformibus, brevibus; floribus sessilibus, glomerulatis, basi bracteolatis; calyce brevissime 5-lobato; antheris linearibus, subrectis, connectivo basi incrassato, antice minute biauriculato, postice gibboso; stylo apice truncato vix incrassato.

Rami satis graciles, cinerei. Petiolus 1-1½cm. longus. Folia membranacea, 8-14 cm. longa, 1-2 cm. lata. Pedunculus communis gracilis, 4-5 cm. longus. Calycis tubus cinereus anguste campanulatus, obscure angulatus, 3 mm. longus. Petala obovata, subacuta, 2 mm. longa. Staminum filamenta 2 mm. longa; antheræ pallidæ, 3 mm. longæ. Stylus filiformis 4 mm. longus.—Aff. *M. aplostachya*, DC. Guanai, 2,000′ ft. (992).

Miconia albicans (Sw.), Tri. l. c. 116. Yungas, 6,000 ft. (2299).

Miconia stenostachya, DC. Prodr. iii. 181. Yungas 6,000 ft. (2258).

Miconia Organensis, Gardn. in Hook. Lond. Journ. Bot. ii. 345. Falls of the Madeira (2281).

Miconia tiliæfolia, Naud. l. c. xvi. 151. Mapiri, 5,000 ft. (2322).

Miconia argyrophylla, DC. l. c. 181. Mapiri, 5,000 ft. (2248).

Miconia lepidota, DC. l. c. 180. Mapiri, 2,500 ft. (2253); 5,000 ft. (2271).

Miconia, near *M. rhytidophylla*, Naud. Yungas, 6,000 ft. (2269).

Miconia sessilifolia, Naud. l. c. 181. Yungas, 4,000 ft. (2270).

Miconia desmantha, Benth. Pl. Hartw. 181. Yungas, 4,000 ft. (2265).

Miconia Ibaguensis (Bonpl.), Tri. l. c. 110. Yungas, 6,000 ft. (2262; 2289); Guanai, 2,000 ft. (2277). The latter specimen det. Cogniaux.

Miconia macrophylla (Don). Tri. l. c. 103. Guanai, 2,000 ft. (2249).

Miconia tomentosa, Don. Mem. Wern. Soc. iv. 316. Junction of the Rivers Beni and Madre de Dios (2251).

Miconia, related to the last. Mapiri, 5,000 ft. (2248).

Miconia calvescens, DC. l. c. 185. Mapiri, 5,000 ft. (2264).

Miconia prasina (Sw.), DC. l. c. 188. Mapiri, 5,000 ft. (2257; 2267). A variable species.

MICONIA MULTIFLORA, Cogn. sp. nov. (sect. *Eumicomia*, F. Paniculares, Fl. Bras.); ramis superne valde compressis, junioribus petiolis paniculis calycibus foliisque subtus dense stellato-puberulis et ferrugineis; foliis longiuscule petiolatis, anguste obovatis, abrupte brevissime obtuseque acuminatis, basi late cuneatis, integerrimis, adjecto utroque nervulo marginali 5-nerviis, supra primum dense stellato-puberulis demum glabris; paniculis majusculis, thyrsoideis, ramosissimis, valde multifloris; floribus minute fasciculatis, sessilibus, ebracteolatis; calycis limbo obscure obtuseque 5-lobato; antheris linearibus, paulo arcuatis, connectivo basi brevissime producto et leviter incrassato, sparse glanduloso; stigmate subpeltato.

Rami robusti. Petiolus robustus, 3-4 cm. longus. Folia subcoriacea, supra pallide viridia, 2 dm. longa. 12 cm. lata, nervis nervulisque subtus valde prominentibus. Paniculæ 2½ dm. longæ. Calyx campanulatus, teretiusculus, 2½ mm. longus. Petala obovata, 2 mm. longa. Staminum filamenta capillaria, 1½ mm. longa; antheræ 2 mm. longæ. Stylus 4 mm. longus. Yungas, 4,000 ft. (2254).

Miconia ternatifolia, Tri. l. c. 118. Mapiri, 5,000 ft. (2255); Yungas, 4,000 ft. (2273).

Miconia minutiflora (Bonpl.), DC. l. c. 189. Mapiri, 5,000 ft. (2276; 2294).

The Carices of the Upper Half of the Keweenaw Peninsula.

CAREX NOTES.—XIII.

BY L. H. BAILEY.

Mr. O. A. Farwell, Phœnix, Michigan, has sent me for determination a complete set of the carices which he has collected in his vicinity during the last four or five years, and the list affords so good a contribution to the knowledge of the geographical distribution of certain species, and is so large a record of the carex flora of a little known and interesting region, that I submit it for publication. Keweenaw County comprises the end of a small and narrow peninsula which juts into the main body of Lake Superior from the southward. It lies wholly above the 47th degree of latitude, and is the most northerly portion of the United States lying in or east of the Great Lakes. Its climate must be almost wholly dominated by Lake Superior. As in all regions adjacent to the Great Lakes, the flora is anomalous. It presents a curious admixture of northern and southern types, yet the northern types are not particularly marked. The writer has always observed this tendency of southern types to creep northwards along the Great Lakes, particularly on the shores opposite the direction of the prevailing winds. These winds, traversing the warmer area of the water, maintain the winter temperature on the shores upon which they blow at a higher point than it reaches upon the opposite side. Thus it appears to be true that the flora of the eastern shore of Lake Michigan has in it more plants of a southern type than has the western shore; at any rate, it is true that the western shore of the State of Michigan presents in its flora a warmer cast than does the eastern shore of the State. Mr. Farwell's plants come from the western side of the Keweenaw peninsula. It would be interesting to compare with them the plants of the eastern side.

The plants which seem to be particularly out of place so far north are *Carex squarrosa*, *C. virescens* var. *costata*, *C. Davisii*, and *C. Jamesii*. On the other hand, there are none which seem to be out of place so far south.

The range of *C. exilis* is much extended by the collection of this plant on the Keweenaw Penisula. The most western locality heretofore known for it is in Wayne Co., Western New York, where it has been collected by E. L. Hankerson. Mr. Farwell writes: "I first collected it in 1884 in a swamp between the Osceola and Calumet mines in Houghton Co., about twelve or thirteen miles from here, where it was very plentiful. I collected it again about six miles northwest of here, in Keweenaw Co., in 1887." *C. exilis* is a rare species, and this extension of range is important.

This region, in common with our whole northern boundary apparently, presents the most perplexing similarities in some of the varities of *C. tribuloides*, *C. scoparia*, and *C. straminea*.

The list comprises sixty-four entries. Following each entry, I have inserted the number which it bears upon Mr. Farwell's label.

C. pauciflora, Lightf. 519.
C. Michauxiana, Bœckl. 664, 665. Frequent in meadows.
C. intumescens, Rudge. 614. Common.
C. oligosperma, Michx. 661. Frequent.
C. utriculata, Boott, 663, 663a, 663b, 714, 714b. Common.
C. utriculata, Boott, var. *minor*, Boott, 714a, 715, 715a.
C. monile, Tuckm. 662, 716, 716a, 716b.
C. retrorsa, Schw. 609, 689. Common.
C. lurida, Wahl. (*C. tentaculata*, Muhl.) 703. Frequent.
C. hystricina, Muhl. 634, 688.
C. squarrosa, Linn. 699. Frequent.
C. scabrata, Schw. 651. Common.
C. Houghtonii, Torr. 632, 633.
C. filiformis, Linn. 640. Frequent.
C. fusca, All. 615.
C. stricta, Lam. 569, 565a, 566, 566a, 566b, 566c. Frequent.
C. stricta × *filiformis*, Bailey, 613. The only station known for this well-marked hybrid.
C. crinita, Lam. 569, 568, 568a, 568b.
C. Magellanica, Lam. 608.
C. limosa, Linn. 606, 607.
C. virescens, Muhl. var. *costata*, Dewey, 697.
C. castanea, Wahl. 611.
C. arctata, Boott, 610.

C. *arctata*, Boott, var. *Faxoni*, Bailey, 639.
C. *arctata* × *flexilis*, Bailey, 612.
C. *debilis*, Michx. var. *Rudgei*, Bailey, 610a, 637, 638, 638a.
C. *gracillima*, Schw. 655. Common.
C. *gracillima*, Schw. var. *humilis*, Bailey, 656.
C. *Davisii*, Schw. & Torr. 700.
C. *Crawei*, Dewey, 701.
C. *granularis*, Muhl. 704.
C. *flava*, Linn. 670, 671, 672, 672a 673. Common.
C. *pallescens*, Linn. 570.
C. *laxiflora*, Lam. var. *varians*, Bailey, 657, 713. Common.
C. *Saltuensis*, Bailey, 243.
C. *aurea*, Nutt. 635, 636. Common.
C. *pedunculata*, Muhl. 41. Common.
C. *Pennsylvanica*, Lam. Common in sand.
C. *communis*, Bailey, 652, 652a.
C. *communis*, Bailey, var. *Wheeleri*, Bailey, 653.
C. *varia*, Muhl. (*C. Emmonsii*, Dewey), 40.
C. *deflexa*, Hornem. var. *media*, Bailey, 244. Bluffs.
C. *Jamesii*, Schw. 698. Infrequent.
C. *polytrichoides*, Muhl. 520. Common.
C. *stipata*, Muhl. 522. Common.
C. *vulpinoidea*, Michx. 521. Common.
C. *tenella*, Schk. 523.
C. *exilis*, Dewey, 389.
C. *echinata*, Murr. var. *cephalantha*, Bailey, 555.
C. *echinata*, Murr. var. *microstachys*, Bœckl. 556.
C. *canescens*, Linn. 604.
C. *canescens*, Linn. var. *vulgaris*, Bailey, 605. Frequent in swamps.
C. *canescens*, Linn. var. *alpicola*, Wahl. 625. Frequent on dry, sterile hills.
C. *canescens*, Linn. var. *polystachya*, Boott, 624.
C. *trisperma*, Dewey, 524.
C. *bromoides*, Schk. 702. Infrequent.
C. *Deweyana*, Schw. 603, 603a.
C. *tribuloides*, Wahl. var. *reducta*, Bailey, 685.
C. *tribuloides*, Wahl. var. *Bebbii*, Bailey, 684, 684a, 683c.

C. tribuloides, Wahl. var. *cristata*, Bailey, 683a.
C. scoparia, Schk. 601, 602a.
C. scoparia, Schk. var. *minor*, Boott, 602.
C. straminea, Willd. 683b.
C. straminea, Willd. var. *mirabilis*, Tuckm. 683.

Pinus Banksiana at the West.

By E. J. Hill.

In the BULLETIN for November, 1889, are two articles on the presence of *Pinus Banksiana*, Lamb., on the coast of Maine, and the impression left by reading the article is, that this station is farther south than any yet reported. In "Garden and Forest" for December 4th, the statement is repeated. A record of a more southern locality is made in Professor Sargent's "Report on the Forests of North America," in one of the volumes of the tenth census, and is quoted in one of the articles. But it is evidently misunderstood, and may be slightly misleading to a casual reader. It is reported as found on "the southern shore of Lake Michigan." This may be taken for a part of the southern peninsula of Michigan, which, in its northern part, extends eastward from Grand Traverse Bay, the lower end of Lake Michigan having an easterly trend for some distance. But if we substitute for this statement "shore of the south end of Lake Michigan," all liability to mistake is removed, and a locality is named considerably further south than that at Frenchman's Bay in Maine. Thinking a detailed account of the distribution of this pine may be of interest to botanists and worth recording, I have compiled this article from my notes and observations and from other available sources regarding its presence west of Lake Huron.

To begin with the locality nearest to Chicago, that at the south end of Lake Michigan, we have one in latitude 41° 35′, or nearly two hundred miles south of that in Maine, and the most southerly of any yet named, as far as I can learn. This is in the counties of Lake and Porter, Indiana. I know of no other localities where it could be expected to occur, unless it be the next two counties south, Newton and Jasper, where there is a similar region of barren sand hills near the marshes of the Kankakee River, and around the head waters of the Iroquois. This was evidently the bed of a lake with its bordering dunes, when the land, now partly covered with the Jack Pine at the head of Lake Michigan, formed a part of the lake itself. The conditions are favorable to its growth, but I do not know of its presence there at this time.

The pine belt in northwestern Indiana begins at Whitings, on the Lake Shore and Michigan Southern Railway, eighteen miles east of its terminus in Chicago, or three miles east of the Illinois State line, and extends eastward for twenty miles, perhaps farther, to Michigan City, (though I have not traced it all the way), since it is reported by Professor Beal as present on the east side of Lake Michigan from Indiana northward. The region of sand becomes narrower as we go eastward, but it is favorable to the growth of this pine. The pine belt is from one to three miles wide, and *P. Banksiana* and *P. Strobus* both abound, the latter having a somewhat wider range. It is a region of sand ridges and shallow ponds and sloughs, once a part of the bed of Lake Michigan, and the conditions are suitable for the two pines to flourish side by side, the dryer and more barren places being taken by the Jack Pine, and the moister and more fertile by the White Pine, though this is not exclusively true of either. Sometimes a Jack Pine will be found a foot in diameter, and thirty to forty feet high, but they are usually much smaller, often mere shrubs, except in form, with fruiting branches a foot from the ground. They frequently form dense thickets, and are sometimes dug up and taken away by nurserymen to be used for hedges or windbreaks, being treated like Arbor Vitæ. Four other conifers are also found, the Red Cedar rarely, the White Cedar, *Thuja occidentalis*, more common,the common Juniper frequently, and a small swamp of Tamarack.

In Michigan I have found it from Manistee southward, as well as in several places north of this, where it is common, and within its general climatic range. Manistee has about the same latitude as Frenchman's Bay. In "Wheeler and Smith's Catalogue of the Plants of Michigan," it is said to come as far south in the western part of the State as Newaygo County, or nearly as far south as Muskegon. In the "Report of the Michigan Forestry Commission" for 1888, it is given a range from Indiana northward. In the central part of the State, according to the above catalogue, it is first seen in the northern part of Clare County, or but little south of the latitude of Manistee, where "it is common in groves on sandy barrens." "In the southeast township of Missaukee County, along the west bank of the Muskegon River, occurs a barren terrace about five miles long by two wide, which is covered by groves of this pine in all stages of growth, from seedlings to fine shapely trees 50 to 60 feet in height, and 12 to 14 inches in diameter." This is essentially in the same latitude as the coast of Maine station. Winchell, in his "Catalogue of Michigan Plants," reports its presence at Sand Point, on the east side of Saginaw Bay, in latitude 43° 50′, and thence northward along Lake Huron. There are several localities for it in the northern part of the southern peninsula, and it is frequently met with in the northern peninsula. I have found it at Escanaba, in the Menominee iron region, at Marquette and westward along the railroads in the Marquette iron district, and on the Keweenaw Peninsula. Here it may be looked for in any barren district.

Coming to the west side of Lake Michigan, it is given a single station in Illinois. M. S. Bebb, of Rockford, Ill., reports it from Ogle County, in which Rockford is situated, or about latitude 42°. This station is quite isolated, seemingly quite far away from any yet given, unless they are found in central Wisconsin. On the west shore of Lake Michigan it does not grow as far south as on the east shore. This shore is much less sandy, the prevailing west winds forming the sand-dunes mostly on the east side of the lake. The farthest south where I can find any mention of it along the shore is Sheboygan, (latitude 43° 40′). This is about the same as that given for its locality on the west side of Lake Huron, at Sand Point. North and west of Green Bay we come into the regions where it prevails once more, as at Oconto and beyond. I have seen it very abundant and in dense groves at Pembine, Wis., and southward.

In Minnesota its range is extensive in the northeastern part. I have seen it along the railroad from Two Harbors on Lake Superior, to Tower, on Vermilion Lake. On dry hills about Tower it is less common than *P. resinosa*, nor does it occur as often as *P. Strobus.* South of Duluth it is seen along the railroad towards St. Paul, which for a long distance passes through a very sandy country, drained by the St. Croix River. In the eastern part of the State it extends as far south as the junction of Snake River with the St. Croix, (latitude 45° 50′). In Upham's "Catalogue of the Flora of Minnesota," (1883), it is said to be "abundant on sandy land in the region of the Upper Mississippi and Crow Wing Rivers, from Brainard and Wadena northward." In the central part of the State it is found north of St. Cloud, and about the same distance south as on the St. Croix, at Brockway, in the north-eastern part of Stearns County, or a few miles north of St. Cloud. East of the Mississippi, it has its southernmost limit in Minnesota, at Princeton, in Mille Lacs County, in the same latitude as St. Cloud, (45° 33′).

Its general southern limit west of Lake Huron may, therefore, be placed at about 43° in Michigan, to 46° in Minnesota, whence after crossing the Mississippi, it extends northwesterly to the Saskatchewan. Aside from this are the southerly extension to the head of Lake Michigan, and the isolated station in northern Illinois.

The New Edition of Gray's Manual.

Manual of the Botany of the Northern United States, including the District east of the Mississippi and North of North Carolina and Tennessee, by Asa Gray. Sixth Edition, revised and extended westward to the 100*th meridian.* Sereno Watson and John M. Coulter, assisted by specialists in certain groups. 8vo., pp. 760; 25 plates: New York, 1890.

By those, who, from the time of its appearance, have made constant use of Dr. Gray's Manual of 1867, this new and revised edition has been waited for with no small degree of interest. That it would come up fully to the wants and demands of the age and incorporate all the results of active investigation carried on since for almost a quarter of a century, was a reasonable expectation. That it has done so, cannot be truthfully said.

Viewed as a manual, or hand-book, designed not only for experienced botanists already in possession of its contents, but chiefly for the great mass of private students, and beginners and learners in schools and colleges, the increase in bulk, caused by the extension of its area and scope, is a disappointment and a drawback. A narrower field, condensation and Linnæan brevity in description and larger print would have been far better, or else, a division into two volumes, or, perhaps, three.

But the book is marred by defects of a more serious character, and one of these relates to the geographical distribution of the rarer species. In a majority of cases their range is either incorrectly, or only partially indicated. The preface, tells us that "all known available sources of information have been made use of." If so, the word "available" must have a covert meaning. The following publications on the floras of New Jersey and Pennsylvania are, no doubt, in the botanical library at Cambridge: Britton's Catalogue of the Plants of N. J., 1881; Porter's Sketch of the Botany of Penn. (with map) in Walling and Gray's Topographical Atlas, 1872; Sargent's Forest Trees in Tenth Census Reports, 1884; Dudley's List of the Plants of the Lackawanna and Wyoming Valleys, Penn., 1887; Porter's List of the Carices of Penn., 1887—and various local catalogues and articles in the Botanical Gazette and the BULLETIN. Moreover, a multitude of plants from this very tabooed region are extant in the Harvard Herbarium, with labels, showing dates and places of collection, plants contributed during a long series of years and often accompanied by what Dr. Gray was wont to call "useful notes." Why these "sources of information" were not "available" may be guessed at. To prove gross neglect, to say the least, on the part of the revisers, corrections are here added for the range of sixty such species, and a like thing might be done for as many more.

Jeffersonia diphylla, Pers. "W. N. Y. to Wisc. and northward." From Central Pa. westward.

Arabis perfoliata, Lam. "From N. E. to Minn. and westward." It occurs in N. J. and E. Pa.

Thelypodium pinnatifidum, Wats. "O. to Minn." It should be W. Pa. and O. to Minn.

Polanisia graveolens, Raf. "Conn. and W. Vt. to Minn." Common along the shores of the Susquehanna down to Chesapeake Bay. A few seen on 4th Lake, [illegible]

Polygala polygama, Walt. "Common." A plant of the eastern seaboard and rare in northern N. J.; not known in Pennsylvania.

Stellaria borealis, Bigel. "R. I. to Minn., and northward." N. N. J. and westward through N. Pa.

Sida Napæa, Cav. "Rocky banks along the Alleghanies, Penn. to Va., rare." The old manual gives one station on the Lower Susquehanna, Pa., and another on the Kanawha, W. Va.

Ilex mollis, Gray. "Burgoon's Gap, Blair Co., Pa., and southward along the Alleghanies." Common on the Pocono plateau, N. E. Pa.

Ilex opaca, Ait. "Me. to Va., near the coast." Cold Spring, Dauphin Co., Pa., and along New River above Kanawha Falls, W. Va.

Robinia Pseudacacia, L. "S. Penn." From Locust Ridge, Monroe Co., Pa., westward and southward along the Alleghanies.

Æschynomene hispida, Willd. "S. Penn." Yes, but from one station on the Delaware below Philadelphia and nowhere else.

Prunus Alleghaniensis, Porter. "Bluffs of the Alleghanies, Pa." It should read: From the barrens of Huntingdon Co., across the Alleghany Mtn. to Elk Co., Pa., frequent.

Cratægus parvifolia, Ait. "N. J. to Florida." Frequent in E. Penn.

Saxifraga erosa, Pursh. "Cold mountain brooks, Pa., southward along the Alleghanies."; Known from one station only in Pa., and that not in the Alleghanies, but near Bethlehem.

Ribes lacustre, Poir. "Nwf. to N. E. and W. to N. Y., &c." It ranges all through N. Penn.

Hippuris vulgaris, L. "N. Y. to Ky. and northward." Collected in 1871 at Spencer Pond, N. Maine.

Sedum telephioides, Mx. N. J. to Ga. and S. Ind." Unknown in N. J.; it has been found at one station in S. Penn., in Fulton County.

Berula angustifolia, Koch. "Throughout the U. S." If so abundant everywhere, it ought to have been picked up in the states south of the New York line.

Erigenia bulbosa, Nutt. "W. N. Y. to Md. and Tenn." Its eastern limit is on the Susquehanna, York Co., Pa.

Triosteum angustifolium, L. "Va. to Ill. and Mo. and Alab." The old Manual has "S. Pa." and is right, for it belongs to the southeastern part of the State

Linnæa borealis, Gron. "N. E. to N. J. and the mountains of Md." The mountains of N. Pa. should have been added.

Aster Shortii, Hook. "Cliffs and banks, O. to Ill. and southward." W. Pa. has been overlooked.

Onosmodium Carolinianum, DC. "W. N. Y. to Minn., south to Ga. and Texas." It occurs in Central and S. Penn

Cnicus pumilus, Torr. "Me. to Pa., near the coast." It grows all over Penn., as far west as the summit of the Alleghanies, and perhaps beyond.

Hieracium Marianum, Willd., var. *spathulatum*, Gray. "Two Top Mountain, Penn." The two stations for this rare and singular variety, which is probably a good species, should have been designated as they are set down in the Synoptical Flora.

Buchnera Americana, L. "W. N. Y. to Minn. and south." From the range thus marked no one would ever suspect that the species grows in S. E. Penn.

Utricularia clandestina, Nutt. "N. B. to N. E. and N. J., near the coast." Not uncommon in mountain-bogs in Central Penn.

Aristolochia Sipho, L'Hér. "Rich woods, Pa., to Ga." Discovered by Dr. Garber at a single point, near the Va. line, in S. W. Penn.

Arceuthobium pusillum, Peck. "N. N. Y.; Hanover, Conn." Lehigh Pond, Pocono Mt., N. E. Pa. (*Dudley*).

Euphorbia commutata, Engelm. "Md. to Fla." "Minn. to Mo." From the banks of the Susquehanna river, Penn. westward.

Juniperus communis, L. "Common." It may be so in N. E. and N. Y., but it is rare in E. Pa. and not reported west of the Susquehanna.

Spiranthes Romanzoffiana, Cham. "N. N. E. to Mich.; Norfolk, Conn.; Central N. Y." At Conneaut Lake and Presque Isle, W. Penn.

Pogonia affinis, Austin. "S. W. Conn., S. N. Y. and N. N. J." Water Gap, Berks Co. and Phila., Penn.

Smilacina trifolia, Desf. "Lab. to N. E. west to Mich. and Iowa. (Sib.)." It has been collected at several points in N. Penn.

Veratrum viride, Ait. "Common." Rare in the mountains of Pa.

Juncus Smithii, Eng. "Sphagnous swamps, Broad Mtn. and in Lebanon Co., Pa." Confined to one swamp on Broad Mtn., Schuylkill Co., Pa. A single dubious specimen was picked up along a railroad in Lebanon Co.

Juncus pelocarpus, E. Meyer, var. *subtilis*, Engelm. "Me. to Canada." Abundant on the shores of an island in Lake Hopatcong, N. J.

Juncus asper, Eng. "Sphagnous swamps, N. J." Very local; found in two such swamps, and in one of them now extinct.

Potamogeton obtusifolius, Mert. and Koch. "Can. and N. E. to W. N. Y. and Mich." The old Manual credits it to E. Penn., where it has been collected in several counties.

Potamogeton Tuckermani, Robbins. "White Mtns., N. H., N. Y. and N. J." In Eastern and Central Penn.

Scirpus sylvaticus, L. "E. Mass. to N.Y., rare." W. N. J. and E. Penn., not uncommon.

Carex Magellanica, Lam. "North of Penn." Pocono Mtn., Pa.

Carex irrigua, L. "North of Penn." N. N. J. and Pocono Mtn., Pa.

Carex flava, L. "N. E. to L. Sup." N. N. J. and W. Pa.

Carex longirostris, Torr. "N. E. to Neb." From N. J. westward through N. Pa.

Zizania aquatica, L. "Common." Along the seaboard and the Great Lakes, but where else ?

Oryzopsis asperifolia, Mx. "N. N. E. to Wisc. and Minn." N. N. J. and westward through N. Pa.

Sporobolus heterolepis, Gray. "Conn. to N. Y. and Minn." In S. E. Pa.

Poa sylvestris, Gray. "W. N. Y. to Wisc. &c." In E. Pa., at several stations, and at one in N. J.

Milium effusum, L. "N. N. E. to Ill." In N. Pa.

Avena striata, Mx. "N. N. E., N. Y. and northwest." In N. Pa.

Phragmites communis, Trin. "Edges of ponds." Along the coast and the Great Lakes, but not elsewhere.

Glyceria elongata, Trin. "N. E. to Mich., Minn. &c., Roan Mtn., N. Car." Common in the mountains of Pa.

Glyceria grandis, Wats. N. E. to N. Y., Mich. and Minn." N. E. Pa., rather frequent.

Lycopodium Selago, L. "Mtn. tops, Me. to L. Sup. and N." Summit of the Blue Mtn., Del. Water Gap., Pa.

Botrychium simplex, Hitchcock. "Me. to N. Y., Minn. and N." Pocono Mtn., Pa.

Pellæa gracilis, Hook. "Mass. to Minn. and N." Sullivan Co., Pa. (*C. E. Smith*).

Lygodium palmatum, Sw. "Mass. to Va., Ky. and sparingly south." Abundant on the Pocono plateau, N. E. Pa.

Equisetum littorale, Kühlewein." Vt. and N. Y. and N." Common along the shores of the Susquehanna river, Pa., down to Chesapeake Bay

Equisetum variegatum, Schleich. "N. H. and Niagara." Presque Isle, Erie Pa.

On the other hand, a few species are credited to N. J. and Pa., whose existence within their borders is open to challenge. Some years ago a list of twenty such was sent to a botanical friend in Cambridge, who carefully examined the Harvard Herbarium, without meeting one of them represented by a specimen from these States.

Another manifest defect is the inaccurate designation of adventive and naturalized species. That an introduced plant might not behave in the same way in all parts of the vast territory so diverse in soil and climate does not seem to have been apprehended. Over a whole state or several states, or, under favorable circumstances, even at a single station, some may take hold and become established, and in the rest of the territory be either unknown, or very precarious in their tenure. Both these things deserve to be noted. And yet, it can be easily shown that not one, or two, but a considerable number, marked as adventives in this new Manual, are thoroughly naturalized in extensive districts outside of New England.

A competent and impartial judge, however, must acknowledge that the book is beautifully printed and remarkably free from typographical mistakes, and that it has cost a large amount of steady labor and contains much that will be prized by advanced students, but, on close examination, they will be forced to ask questions like these:

Why have the *Coniferæ* been retained in their old place?

Why has Prof. Underwood's excellent elaboration of the *Hepaticæ* been appended, and the *Musci* passed by?

Why have older names of genera and species been restored in some cases, and not in others?

Why have good published species and varieties, known to the revisers, been excluded, and yet copious lists of real and supposed hybrids given?

Why have species and varieties been admitted whose claims are still doubtful?

Why have species seen by no American botanist, been inserted, solely on European authority and that not of the first order?

Why have names, clearly proved untenable, not been discarded—for example, *Gentiana alba,* Muhl., which is rightfully *G. flavida,* Gray?

It is a matter for regret that the new editors, with all the great resources at their command, and the advantages of their position, should have failed to come squarely up to the requirements of the age and the present level of botanical science in our own country. Had they done so, the book might have counted on the occupation of the field they profess to cover, for a generation to come, without fear of rivalry. As it is, the contents are of unequal value and not homogenous. They are marred here and there by inexcusable faults of omission and faults of commission, and betray the absence of one master-mind, which making "use of all known available information," would have shaped and moulded the different elements so as to have produced a proportionate and harmonious whole.

THOS. C. PORTER.

CHARLES CHRISTOPHER PARRY.

Dr. Parry died at his home in Davenport, Iowa, on the morning of February 20th, after an illness of several weeks, pneumonia succeeding a violent attack of the influenza. Another of America's famous botanists is gone from us, one whose services in the elucidation of the flora of our country have been equalled by but few, and whose knowledge of the plants of the western part of the continent was probably exceeded by none.

A brief account of his life and labors is here given, with the certainty that they will be more fully and suitably recognized in another place.

Dr. Parry was born at Admington, Worcestershire, England, August 28th, 1823. He came to the United States in 1832, and spent the next years of his life with his father's family, on a farm in Washington County, New York. He was graduated from Union College, and subsequently received the degree of Doctor of Medicine. In 1846 the family moved to Davenport, Iowa, where he practiced his profession for several years. But he early developed a great fondness and aptitude for botany, and this soon became almost his sole occupation.

His earliest work in that science was done, indeed, about 1842, while in northeastern New York, and in 1847 a great impetus was given to it by his making the acquaintance of Dr. Torrey, and the formation of a friendship which was unbroken during his lifetime. The study of the Davenport flora occupied Dr. Parry's attention for several years. In 1848 he served on Dr. David Dale Owens' Geological Survey of the northwest, and from 1849 to 1852 he was one of the botanists of the Mexican Boundary Survey. In 1861 he made an extensive collecting tour to the Rocky Mountains, and first discovered many of the most interesting plants of that region; this exploration was continued in 1862 in company with Messrs. Hall and Harbour, and again in 1864. In 1867 he accompanied the Pacific Railroad Survey of the 35th Parallel. From 1869 to 1871 he was botanist of the United States Department of Agriculture, and stationed at Washington. In 1872 he again collected in the Rocky Mountain region. In 1873 he was attached to Captain W. A. Jones' Wyoming Expedition. The seasons of 1874 and 1875 were spent in Utah, and of 1876 with Prof. J. G. Lemmon, in southern California, where a very large collection was accumulated. The season of 1878 was spent in the vicinity of San Luis Potosi, Mexico, and in Texas with Dr. Edward Palmer. Of recent years he has paid especial attention to the Californian flora, in close co-operation with Professor Greene.

Dr. Parry was for many years an active and energetic member of the Davenport Academy of Sciences, and was several times its President, and he was a correspondent of numerous other learned societies of America. He made several trips to his native land, and was well-known and esteemed by English and Continental botanists. He was essentially a field student, and the accuracy of his conclusions and observations is largely to be attributed to this fact. Indeed, the bulk and value of his collections, and the number of novelties discovered by him, has probably not been equalled in America. Some of these were published by himself, but the greater part by others, especially by Dr. Torrey, Dr. Engelman, Dr. Gray, Professor Greene, and Dr. Watson. The amount of his writings is not at all in proportion to his discoveries. Of late years he has been especially interested in the genera *Eriogonum*, *Chorizanthe*, *Ceanothus* and *Arctostaphylos*, on all of which he has written at length. He was the author of several lists of plants from the western country, and an occasional contributor to the BULLETIN and other scientific journals.

Personally Dr. Parry was a man of gentle, unassuming nature, and beloved by all who knew him. He was a close student, and continually at work on his chosen science. In the possession of a moderate income, he was enabled to gratify his tastes without need of other occupation. The tidings of his death will bring sincere grief to botanists at home and abroad. His work is commemorated in the genus *Parryella* and in a great number of species, *Primula Parryi* being one of the most elegant plants of its family.

N. L. BRITTON.

Reviews of Foreign Literature.

Ueber Anlage und Ausbildung von Libriformfäsern in Abhangigkeit von ausseren Verhaltnissen.

This article, which is reviewed in the Botanische Centralblatt, appeared in the Botanische Zeitung some time ago. The question considered is, how far the origin and development of plant tissues are dependent on outward surroundings, particularly the changes which occur in the xylem, the origin and growth of the libriform and its accompanying cells. In other words, the author has tried to prove that the anatomical structure of the plant, as well as its morphological characteristics, depends largely on its environment.

The plants experimented upon were *Urtica dioica*, *Robinia Pseudacacia*, *Quercus sessiliflora* and *Ricinus communis*. Dwarf plants of *Urtica* were cultivated in small pots, others of the same species were grown in water in which were dissolved the salts adapted to them with the exception of phosphates. The results showed that the plants cultivated in pots with a comparatively small supply of water, developed a much larger libriform zone and a correspondingly smaller parenchymatic zone than those of the water culture. In order to prove that the lack of phosphates had nothing to do with this difference in the xylem, examples of *Robinia Pseudacacia* and *Quercus sessiliflora* were cultivated in water. Here it was found that the anatomical structure of the stem had been caused to approach that of the roots in several ways, namely, by a considerable lengthening of the elementary organs, by a lessening of the number of sclerenchymatic cells and a decrease in the thickness of their walls. It will be remembered here that the stem was kept for the most part under water.

The results of the experiments are summed up by the reviewer. First, the structure of the wood of the stem is not so constant, not so sure to be transmitted from one generation to the following, as has been hitherto supposed. If it is proven that through a long line of generations, the inner structure of the stem of any given species has remained constant, it can also be proven that the environment has remained about the same. When this is changed, then the anatomy of the stem changes. The plant, therefore, inherits only the ability to produce a certain series of elementary organs. What is to be made of the cell cut off from the cambium, is determined by outward circumstances. The existence of a large variety of transitional forms among these elementary organs of the wood tissue is explained by this theory in a much more reasonable way than by any functional theory which can be suggested.

Just what these influences are which control the manner of growth, the author does not claim to know. By his experiments, however, he claims to have proven that water is a leading factor. As stem and root are accustomed to grow in different media, they therefore show a difference in their elementary organs. It must be possible to change the woody tissue of the stem to that of the root and *vice versa.* This latter possibility he claims to have verified.

The reviewer adds his own testimony to many of the conclusions drawn from the experiments described, having carried on similar experiments several years ago. A single sentence of the reviewer gives the key to the whole article. This translated as literally as possible is as follows: "The anatomical structure depends on the influence of outward circumstances, and is adapted to the causes at work during the life of the plant, but this adaptation does not necessarily involve the idea of function or purpose." E. L. G.

Index to Recent American Botanical Literature.

Abstammung der Platanen. Johann Janko. (Bot. Jahrb. xi. 412-458, pl. IX. & X).

The important part which the American fossil representatives of the genus *Platanus* play in this investigation is admirably depicted by the author, in addition to which this article is a welcome contribution to general palæo-botany. The bibliography and table of synonomy for the fossil species is of great value and is deserving of special mention.

Acalypha Virginica, Considerata in Ordine alla Diffusione nel Veronese. A. Goiran. (Giorn. Bot. Ital. xxii. 134-136).

Bald Cypress.—The Knees of the. N. S. Shaler. (Garden and Forest, iii. 57).

A criticism of Dr. Lamborn's hypothesis, indexed in the last number of the BULLETIN.

Botany at the A. A. A. S. C. E. Bessey. (Am. Nat., xxiii, 816–819).

An abstract of the work accomplished at the Toronto meeting in Sec. F. of the Association, in the meetings of the Botanical Club and at the sessions of the Society for the Promotion of Agricultural Science.

Cabomba aquatica. J. D. H. (Bot. Mag. Tab. 7090).

California Palms. S. B. Parish. (Garden and Forest. iii., 5152).

Casssine Domingensis, Spr.—Uber. A. Garcke. (Engler's Bot. Jahrb. xi. 410, 411).

Clintonia Andrewsiana. J. G. Baker. (Bot. Mag., Tab. 7092).

Disease of the Strawberry.—Another. W. R. Dudley. (Bull. No. xiv., Agric. Exp. Sta., Cornell Univ., 182, 183, fig. 10).

The disease turns out to be due to *Ascochyta Fragariæ*, Sacc.

Epigæa repens.—Double Flowers of the. Kate E. Wilson. Bot. Gaz. xv. 19, 20).

In this communication the fact is noted that this plant occasionally produces double flowers. One locality near Plymouth, N. H., is specially mentioned as a habitat for the sport. As might be expected, the doubling of flower has resulted in important transformations of its parts.

Filicineæ.—On the Affinities of the. Douglas H. Campbell. (Bot. Gaz. xv. 1-7, with diagram).

The author here assumes the possibility of the Ophioglosseæ being a primitive stock with two main derivative branches: Marattiaceæ possibly terminating in Cycadaceæ, and Filices terminating in Marsiliaceæ and Salviniaceæ. The Hymenophyllaceæ are assumed to be a degenerate group whose exact point of departure from the Filices is problematic. The author desires fresh fruiting specimens of the Ophioglosseæ for study.

Flora of Cap-a-L'Aigle.—Notes on the. Robt. Campbell. (Can. Rec. Sci. iv. 54-68).

This excellent local catalogue unfortunately includes only those plants found in flower or fruit during the months of July and August. We trust that the author will extend his work so as to cover the entire flowering season.

Flora of Milwaukee County, (First Supplement). W. M. Wheeler. (Proc. Nat. His. Soc. Wisconsin, 1889, pp. 229-230).

Includes a list of 43 additions to Mr. Lapham's list of the Wisconsin Flora.

Garden Vegetables.—The History of. E. L. Sturtevant. (Am. Nat. xxiv. 30–48).

In this contribution the author describes Nasturtium, (*Tropæolum minus, T. majus, T. tuberosus*); New Zealand Spinach, (*Tetragonia expansa*); Nightshade, (*Solanum nigrum*); in regard to which he says * * * "and in the Mississippi valley the little black berries are made into pies and other pastry;" Okra, (*Hibiscus esculentus*); Olluco, (*Ullucus tuberosus*); Onion, (*Allium cepa*); Orach, (*Atriplex hortensis*); Oxalis, (*Oxalis crenata, O. Deppei*); Para cress, (*Spilanthes oleracea* and *S. fusca*); Parsley, (*Apium petroselinum,*) and Parsnip, (*Pastinaca sativa*).

Kalenchœ carnea. (Garden and Forest, iii. 52, fig. 14).

Leo Lesquereux. C. R. Barnes. (Bot. Gaz. xv. 16-19).

A biography with special reference to his work in bryology.

Lily Disease in Bermuda—The. A. L. Kean. (Bot. Gaz. xv. 8-14, Pl. I).

The disease here described and figured has caused considerable loss in the lily fields of Bermuda when it first made its appearance in 1885. The author concludes, from his experiments, that it is due to a species of *Botrytis*, identical with the one which has been described as growing upon *Lilium candidum* in England.

Missouri Botanical Garden.—First Annual Report of the Director. Wm. Trelease. (Pamph. 8vo., St. Louis, 1890).

To all who have not followed the work of this splendid institution, this little pamphlet is heartily recommended for perusal. It gives the history of its founding, work thus far accomplished, and projects for the future.

Nettle Tree.—The. (Garden and Forest, iii. 39, 42, fig. 7-13).

A well written and excellently illustrated article upon *Celtis occidentalis* and its various forms.

Picea Breweriana. (Garden and Forest, iii. 63, 64, figs. 15-16).

Plants from Baja, California. T. S. Brandegee. (Proc. Cal. Acad. Sci. (II.) ii. 217-232, eleven plates and a map; reprinted).

This is an enumeration with critical notes and descriptions of new species of Mr. Brandegee's extensive collection of Lower Californian plants, made during the early part of last year, and of which Dr. Millspaugh's review of the Euphorbiaceæ was noted in the January BULLETIN. As was there indicated, the collection is exceedingly rich in novelties, new species and varieties being described by the collector in the following genera: *Lyrocarpa*, *Helianthemum*, *Polygala*, *Drymaria*, *Horsfordia*, *Sphæralcea*, *Bursera*, *Schœpfia*, *Hosackia*, *Dalea*, *Tephrosia*, *Æschynomene*, *Cæsalpinia*, *Hoffmannseggia*, *Lysiloma*, *Cotyledon*, *Lythrum*, *Œnothera*, *Lopezia*, *Cyclanthera*, *Mamillaria*, *Cereus*, *Opuntia*, *Aralia*, *Aplopappus*, *Psilactis*, *Franseria*, *Viguiera*, *Alfordia*, a new genus of Helianthoid Compositæ, *Encelia*, *Palafoxia*, *Vallesia*, *Gilia*, *Phacelia*, *Ipomœa*, *Cuscuta*, *Stemodia*, *Herpestis*, *Castilleia*, *Beloperone*, *Justicia*, *Lippia*, *Salvia*, *Boerhaavia*, *Atriplex*, *Eriogonum*, *Chorizanthe*, *Zephyranthes*, *Agave* and *Yucca*. The grasses were elaborated by Dr. Vasey, and new species found in *Cenchrus*, *Sporobolus* and *Diplachne*. The Pteridophyta, studied by Professor Eaton, number 13 species, of which one *Cheilanthes* is perhaps new. 14 Fungi are enumerated by Dr. Harkness, including a new *Puccinia* Messrs. Coulter & Rose contribute description of a new species of *Arracacia*. Altogether this is a most important contribution to West American Botany. N. L. B.

Plants from the Erian and Carboniferous, and on the Characters and Affinities and Palæozoic Gymnosperms.—On the. J. W. Dawson. (Can. Rec. Sci. iv. 1-28, figs. 1-6).

Dictyocardites Lacoi is described and figured as a new genus and species. A figure of *Tylodendron* is given and *T. Baini* is described as new.

Plants of Prospect Park.—The. S. E. Jelliffe. (Reprint from Brooklyn Daily Eagle Almanac. Brooklyn, N. Y., 1890).

In this catalogue both native and introduced plants are enumerated. The Phanerogams number 286 and the Cryptogams 62. Amongst the latter are included 9 ferns, 18 mosses, 2 hepatics, 16 fungi, 11 lichens and 6 fresh water algæ. With the coöperation of the Park officials this excellent list could be made available for public use and instruction. A similar one is needed in every one of our large public parks.

Pleurothallis ornata. (Bot. Mag. Tab. 7094).

Robinia Pseudacacia.—On the Chemical Constituents and Poisonous Principle of the Bark of. F. B. Power and Jacob Cambier. (Pharm. Rundsch. viii. 29-38, illustrated).

Seed-Wings of the Abietineæ.—A Preliminary Study of the. G. N. Best. (Microscope, x. 1-6, pl. I).

Wing cells and seeds of *Pinus inops*, *P. pungens*, *P. monticola*, *P. rigida*, *P. Strobus*, *Tsuga Canadensis*, *Pseudotsuga Douglasii*, and *Picea Canadensis* are figured.

Solanum Wendlandi. (Garden, xxxvii. 104, 105, Pl. 738).

Sphærella Fragariæ, Saccardo. W. R. Dudley. (Bull. No. xiv, Agric. Exp. Sta. Cornell Univ. 171-182, figs. 1-9).

Thrinax excelsa. (Bot. Mag. Tab. 7088).

Tigridia Pringlei. J. G. Baker. (Bot. Mag. Tab. 7089).

Umbelliferæ.—A New Genus of. J. M. Coulter and J. N. Rose. (Bot. Gaz. xv. 15, 16, Pl. ii).

A description and figure of *Donnellsmithia Guatemalensis*, collected by John Donnell Smith in Guatemala, July, 1889. The authors conclude that the genus is most nearly related to *Eulophus.*

Uredinial Parasites. H. J. Webber. (Am. Nat. xxiv. 75, 76).

Walnut Tree.—The Row Farm. J. T. Rothrock. (Forest Leaves, ii. 133, 134, illustrated).

A description, with illustrations of tree and fruit, as an anomalous walnut, perhaps a hybrid between *Juglans nigra* and *J. regia*, at Lower Brandon, Va. The girth of the trunk is said to be more than thirty-one feet and a single branch on the south side of the tree extends to a distance of sixty-seven feet.

Working of the Madison Lakes.—The. Wm. Trelease. (Trans. Wis. Acad. Sci. Art. and Letters, vii. 121-129, pl. X).

A description of the vegetation included in the scum formed upon lakes Mendota and Monona. The appearance of this scum is often spoken of as the "working" of the lakes. A long list of citations in regard to the subject of "water bloom" is appended. The plate includes figures of *Anabæna Hassallii. A. circinalis, A.* (*Sphærozyga*) *flos-aquæ. A. Mendotæ*, *Lyngbya Wollei*, *Cœlosphaerium Kützingianum*, *Clathrocystis æruginosa*, and *Nostoc flos-aquæ.*

Proceedings of the Club.

The regular meeting was held Tuesday evening, Feb. 11th, Dr. Newberry in the chair and twenty-five persons present.

Rev. Dr. Wendell Prime was elected a Corresponding Member.

The Editor read by title a paper on "Seedless Fruits," by Dr. E. Lewis Sturtevant, which will form No. 4 of the Memoirs.

The following paper was then read, as announced: "Notes on the Growth of the Cell-wall," by Miss Emily L. Gregory.

Mrs. Britton reported *Fissidens Ravenellii* as among a collection of mosses sent by Mr. Lighthipe from Florida.

Dr. Newberry exhibited photographs of fossil plants from the Cretaceous rocks of Kansas, remarking especially upon the recent discovery of *Cycadites.*

The second February meeting was held at Barnard College, Wednesday evening, Feb. 26th, Mr. Hollick in the chair and twenty-one persons present.

Dr. Britton called the attention of the Club to the death of Dr. C. C. Parry, and remarked on his extensive and valuable work in North American Botany.

"The Flora of the Straits of Magellan," by Dr. Britton, the paper announced for the evening, then followed. It was illustrated by a collection of plants made in 1886, by Lieut. W. E. Safford, U. S. N. Among the specimens were *Ranunculus aberrans*, *Draba Saffordi* and *Vicia Saffordi*, new species named by Dr. Philippi. Especial attention was called to the large number of boreal species inhabiting southern South America.

Mr. Hollick reported *Anemone Hepatica* in full flower on Staten Island, Feb. 16,—the earliest record he has had for twenty years. Dr. Jelliffe stated that this *Anemone* and a *Viola*, probably *V. cucullata*, were gathered in the Richmond Hills woods, Long Island, January 15th.

MISSOURI
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Vol. XVII.] New York, April 10, 1890. [No. 4.

Contributions to Canadian Bryology.—No. 2.

By John Macoun.

(Continued from Vol. xvi. 98).

List of Mosses collected in British Columbia and the Rocky Mountains during the Summers of 1885–'87–'89.

Determinations and descriptions of new species by Dr. Nils Conrad Kindberg, Linkoping, Sweden.

Andræa petrophila, Ehrh. Not uncommon on rocks on the Gold Range, B. C. and Mounts Benson and Arrowsmith, Vancouver Islands.

A. Huntii, Limpr. On rocks on Mount Benson, near Nanaimo, Vancouver Island, June 8, 1887.

Andræa Macounii, Kindb. (n. sp.).

Stem elongate, about 5 cm. high. Tufts dark brown. Leaves narrow, from the broader base long-acuminate, distinctly papillose, more or less denticulate, sometimes to the middle, more or less curved, the uppermost falcate; cells uniform, sub-quadrate; costa narrow, sometimes in the uppermost leaves excurrent.

No. 382—A lovely species of a rich dark brown or brick-red color growing in great profusion on sloping rocks by small rivulets at an altitude of 6,700 feet on the Gold Range, north of Griffin Lake, British Columbia, August 8, 1889.

Gymnostomum curvirostrum, Hedw. On limestone rocks around springs and by waterfalls, Peace River, Rocky Mtns., Lat. 56°.

GYMNOSTOMUM (Hymenostylium) PLATYPHYLLUM, Kindb. (n. sp.).

Diœcious. Plants green, not glossy. Stem not papillose, sparingly radiculose, leaves decurrent, distinctly papillose, short, obtuse, oblong-lanceolate, the comal greater, one border recurved often all around; costa greenish-yellow, very papillose.

Collected on the face of a small water-fall in the brook that flows into the Thompson, just west of Kamloops, less than half a mile south of the C. P. Ry., June 16, 1889.

Weissia viridula, Brid. On earth at Morley, Rocky Mountains.

Dicranoweissia crispula, Lindb. On large boulders Cathedral Mountain, Rocky Mountains.

D. cirrhata, Lindb. Abundant on logs and stones on Vancouver Island and at Hastings, B. C.

Cynodontium polycarpum, Schimp. Common on rocks in the mountains of Vancouver Island, North Arm of Burrad Inlet, B. C.

C. strumiferum, De Not. (*C. polycarpum*, Schimp., var. *strumiferum*, Lesq. and James, 69.) On rocks on the summit of Mount Benson, Vancouver Island.

C. virens, Schimp. Abundant on wet rocks, Kicking Horse Lake, Rocky Mountains, and on the summit of the Gold Range, B. C.

Var. *serratum*, Bruch and Schimp. In wet gravel along mountain streams at Griffin Lake and North Thompson River, B. C.

C. Wahlenbergii, C. Haertm. On the mountains north of Griffin Lake, Gold Range, B. C.

Dichodontium flavescens, Lindb. (*D. pellucidum*, var. *serratum*, Lesq. and James, p. 62.) Wet rocks, Comox, Vancouver Island; on wet sandstone rocks in a railroad cutting at Hastings, Burrad Inlet, B. C.

D. pellucidum, Schimp. In gravel in the bed of Eagle River, Griffin Lake, and in Blackwater River, B. C.

Trematodon ambiguus, Hornsch. On wet loam at Craigallachie, Eagle River, B. C.

Angstrœmia longipes, Bruch and Schimp. On wet sand in the bed of Six Mile Creek, Selkirk Mountains, B. C.

Dicranella crispa, Schimp. On turned up stumps, Beaver Creek, Selkirk Mountains, also McLeod's Lake, Lat. 55°, B. C.

D. Grevilleana, Schimp. On earth, dry bed of Six Mile Creek, Selkirk Mountains, B. C.

D. Schuberi, Schimp. In limestone springs, Lake Mara, Sicamous, and summit of Gold Range, B. C.

D. varia, Schimp. Common on mud banks along the Athabasca River at Fort Assiniboine.

D. parvula, Kindb. Bull. Torr. Bot. Club, xvi. p. 91. On earth, on the mountains north of Kicking Horse Lake, Rocky Mountains, alt. 7,500 feet, 21st July, 1885.

D. rufescens, Schimp. On wet sandstone rocks in a cutting at Hastings and by a brook at Yale, B. C.

D. heteromalla, Schimp. On turned up stumps, and loamy earth in woods, B. C.; common.

Dicranum Starkii, Web. and Mohr. Common on Mounts Benson, Mark and Arrowsmith, Vancouver Island; also on the Gold Range, Griffin Lake, B. C.; alt. 7,000 feet.

D. Blyttii, Bruch and Schimp. On steep rocks, Mount Benson, Vancouver Island, and on rocks at Sicamous, B. C.

D. strictum, Schleich. On rotten logs in woods, Vancouver Island; abundant at Hastings, Agassiz and Yale, B. C.; and Peace River, Lat. 56°.

D. viride, Schimp, var. GROSIFERUM, Kindb. n. var.
On the base of trees at Agassiz, B. C., May 19, 1889.

D. flagellare, Hedw. On old logs at Sicamous, B. C.

D. albicans, Bruch and Schimp. In crevices of rocks, on the summit of the Gold Range, at Griffin Lake, B. C.; alt. 7,000 feet.

D. congestum, Brid. (*D. fuscescens*, Lesq. and James in part, 72.) Common on earth in woods at Hastings, Agassiz, Yale and Sicamous, B. C.; also at Morley, Rocky Mountains.

D. fuscescens, Turn. On logs in the Rocky and Selkirk Mountains; also Gold Range, B. C.; and at Cameron Lake, Vancouver Island.

D. elongatum, Schwaegr. On earth near Victoria, Vancouver Island; also in woods, Peace River.

D. Muhlenbeckii, Bruch and Schimp. On rocks, Mount Queest, Shuswap Lake, Cache Creek, and Blackwater River, B. C.

D. rhabdocarpum, Sulliv. On damp rocks, Lake Mara, Sicamous, B. C.

D. fragilifolium, Lindb. On logs near Victoria, Vancouver Island; also at Yale, B. C.; Little Slave Lake, Lat. 55°.

D. ANGUSTIFOLIUM, Kindb. (n. sp.).

Stem about 5 cm. high, radiculose. Leaves shining, subuliform, not undulate, very narrow, 1-5 cm. long, denticulate to $\frac{1}{3}$ or from the middle upward, not crispate, brittle, straight or patent; cells very porose and narrow; outer alar cells brown, inner hyaline; costa smooth at the back, faint and very narrow (about $\frac{1}{10}$ of the leaf near the base) scarcely excurrent. Capsul straight, long-beaked. Allied to *D. subulifolium*, but differing in the longer leaves, longer leaf-cells and doubly narrower, not excurrent costa. On logs and damp rocks, frequent in British Columbia from the coast to the Gold Range, 1889.

D. scoparium, Hedw. Not uncommon on logs in the Rocky Mountains and westward.

Var. *scopariforme*, Kindb., Bull. Torr. Bot. Club, xvi. 92. Buffalo Lake, Athabasca; also in the Gold Range, B. C.

D. majus, Turn. On logs, near Victoria, Vancouver Island.

D. palustre, Bruch and Schimp. On damp rocks, North Arm, Burrad Inlet, B. C.

SUB-SP. COLUMBIÆ, Kindb.

Cæspitose, tomentose and yellowish green. Leaves open-erect, undulate above, ovate-lanceolate, obtuse or short-acute, serrate at the back and on the borders above; the uppermost cells oblong, the others linear, except the quadrate ones at the angles; costa narrower, disappearing below the apex. Capsule solitary, narrow-cylindric, curved, striate, pale brown, not strumose; beak as long as the capsule; pedicel yellow. Diœcious.

Differs from the true *D. Bonjeani*, De Not. (*D. palustre*, Schimp.) principally in the leaves being blunt, serrate below the middle, the costa serrate also below the middle and the capsule without a neck. Damp woods by the borders of ponds, Cedar Hill, near Victoria, Vancouver Island; and on Cache Creek Mountains, B. C. Alt. 2500 feet, May 25, 1875.

D. CANADENSE, Kindb. n. sp.

Size robust; habit of *D. majus* or *D Drummondii.* Stem radiculose. Leaves indistinctly undulate, long-acuminate, denticulate at the acumen; inner basal cells hyaline, the alar orange, the other cells sublinear and porose; costa smooth or slightly rough, not excurrent, broad at the base, narrow above. Capsule short-beaked, curved, finally costate and blackish.

On rotten logs at Moodyville, Burrad Inlet, B. C. April 29, 1889.

D. SULCATUM, Kindb. n. sp.

Intermediate between *D. fuscescens* and *D. congestum* but the leaves are still narrower. Stems very tomentose. Leaves slightly twisted, only the upper curved, denticulate from the middle upward, ovate-lanceolate, gradually narrowed into a long setaceous point; cells porose, the lower long, the upper short; costa long-excurrent, broad, one-fifth of the leaf near the base. Capsule curved, furrowed when dry, substrumose; peristome dark red.

On the ground and on logs at Victoria, Vancouver Island, 1887; quite common between Burrad Inlet and the Gold Range, B C. 1889.

D. SUBULIFOLIUM, Kindb. n. sp.

Stems low, 2-3 cm. high, not, or sparingly radiculose. Leaves yellowish, patent, scarcely brittle, very narrow and sub-setaceous, the subula denticulate above; cells narrow, porose; costa about one-sixth of the leaf in length, smooth at the back, often excurrent. Capsule small, straight and cylindric; seta yellow.

On old logs, in woods at Cedar Hill, near Victoria, Vancouver Island, April, 1887.

Fissidens limbatus, Sulliv. On clay banks along an old road at Comox, Vancouver Island.

F. minutulus, Sulliv. On earth at Comox, Vancouver Island.

F. tamarindifolius, Brid. On the base of trees subject to inundation, Eagle River Valley at Sicamous, B. C. August 7, 1889. New to America.

F. osmundoides, Hedw. On earth in woods at Sicamous, B. C.

Ceratodon purpureus, Brid. Common in all suitable places.

Var. *xanthopus*, Sulliv. Not uncommon on rocks, near Victoria, Vancouver Island.

C. minus, Aust. On moist soil near Victoria, and at Comox, Vancouver Island; west of Frazer River, at Quesnel, B. C.

C. conicus, Hampe. On the base of a stump in dry open woods, near Spence's Bridge, B. C. May 29, 1889. New to America.

Trichodon cylindricus (Hedw.), Schimp. Along ditches at Victoria, Vancouver Island; also at Hastings, B. C. in some localities.

Distichium capillaceum (Hedw.), Bruch and Schimp. Crevices of damp Rocks, Rocky Mountains and Gold Range, B. C.; also Mount Arrowsmith, Vancouver Island.

D. inclinatum (Hedw.), Bruch and Schimp. Damp crevices of rocks, Peace River. Lat. 56° 16'.

Blindia acuta (Hedw.), Bruch and Schimp. var. *flexipes*, Ren. and Card. Along the Nanaimo River, Vancouver Island; on rocks in a mountain torrent at Yale, and along the Bonaparte River, B. C.

Pottia cavifolia, Ehrh. On dry earth on the west side of the Thompson River at Lytton, B. C.

P. intermedia, Turn. On earth at Yale and Cache Creek. B. C.

Didymodon rubellus, Bruch and Schimp. Crevices of rocks, Bow River Pass, Rocky Mountains, and at Spence's Bridge and Lytton, B. C.

Leptotrichum flexicaule, Hampe. Wet rocks Peace River Canon, Lat. 56°; Kicking Horse Lake, Rocky Mountains; shore of Lake Mara, Sicamous, B. C.

Var. *densum*, Schimp. Calcareous rocks at Morley, Rocky Mountains and in the Columbia Valley at Donald, B. C.

L. glaucescens, Hampe. On the bank of a creek at Sicamous; and on the summit of Mount Queest, Gold Range, B. C.

Desmatodon latifolius, Brid. On earth Blackwater River; and on Mount Queest, and mountains north of Griffin Lake, Gold Range, B. C. Alt. 6,500 feet.

D. cernuus, Bruch and Schimp. On wet rocks in a ravine at Kamloops, and on earth at Cache Creek, B. C.

Barbula brevirostris, Bruch and Schimp. On earth under Douglas Fir, at Morley, Rocky Mountains.

B. rigida, Schultz. On rocks Rocky Mountains Canon, Lat. 56°

B. ambigua, Bruch and Schimp. On calcareous earth at Quesnel, B. C.

B. unguiculata, Hedw. On earth along the Frazer River at Port Henry, B. C.

B. fallax, Hedw. On wet earth in a ditch at Comox, Vancouver Island.

B. rigidula, Schimp. On earth by a brook at Lytton, B. C.

B. rubiginosa, Mitt. Quite common on rocks at Cedar Hill and Comox, Vancouver Island, and on Mount Erskine, Salt Spring Island.

B. flexifolia, Hampe. Quite common on damp earth along the southern coast of Vancouver Island; also at Burrad Inlet, B. C.

B. virescens, Lesq. On rocks at Agassiz and Sicamous, B. C.

B. cylindrica, Schimp. Very abundant on rocks subject to inundation along the Frazer River from Hope to Lytton, B. C.

B. gracilis, Schwaegr. On rocks subject to inundation, Peace River Canon, Lat. 56° and at Yale in B. C., in same situation.

VAR. SQUARRULOSA, Kindb. n. var.

Leaves squarrose, distinctly papillose, faintly reflexed at the base, flat or canaliculate above.

On rocks subject to inundation at Yale, B. C. This was sent to Austin in 1875 and referred doubtfully by him to *B. gracilis*.

B. convoluta, Hedw. By the roadside at Comox, Vancouver Island.

B. tortuosa, Web and Mohr. On rocks, Kicking Horse Lake, Rocky Mountains; on Mount Queest, Gold Range, and at Sicamous, B. C.; Mount Arrowsmith, Vancouver Island.

B. subulata, Beauv., var. LONGIFOLIA, Kindb. n. var.

Intermediate between *B. subulata* and *B. angustata*. Leaves long and narrow, acuminate and acute, distinctly denticulate above, papillose, yellow, bordered; costa long-excurrent, but shorter in the perichætial leaves.

Not uncommon on the base of trees near Victoria, Vancouver Island and on rocks at Yale, B. C.

B. angustata, Wils. On rocks at Morley, Bow River Pass, Rocky Mountains; abundant on earth along brooks at Spence's Bridge, Lytton and Agassiz, B. C.; new to North America.

B. lævipila, Bruch & Schimp. On the base of trees, Cedar Hill, near Victoria, Vancouver Island.

B. alpina, Bruch & Schimp. On rocks within the Rocky Mountains, Bow River Pass. Lat. 56°. New to North America.

B. ruralis, Hedw. Dry rocks, Kananaskis River, Rocky Mountains; also at Victoria, Vancouver Island.

Var. *ruraliformis*, Besch. On a sand spit at Comox, Vancouver Island; also at Lytton, B. C.

B. aciphylla, Bruch & Schimp. On rocks, summit of Mount Queest and mountains north of Griffin Lake, Gold Range, B. C.; Alt. 6,500 feet. New to North America.

B. megalocarpa, Kindb. Bull. Torr. Bot. Club, xvi. 92.

On rocks at Cadbow Bay near Victoria, Vancouver Island; also abundant at Yale, Agassiz and Sicamous, B. C.

B. Muelleri, Bruch & Schimp. On rocks near Victoria, Vancouver Island; also at Yale and Lytton, B. C.

Grimmia conferta, Funk. On dry rocks, Mount Queest, Gold Range, at Lytton and Blackwater River, B. C.

G. apocarpa, Hedw. On dry rocks, Morley, Rocky Mountains and at Kamloops, B. C.

Var. *gracilis*, Nees. & Hornsch. Quite common on precipices and faces of steep rocks at Moodyville, Agassiz and Sicamous, B. C.; also at Kananaskis, Rocky Mountains.

Var. *rivularis*, Nees. & Hornsch. On stones in Cornwallis River, Comox, Vancouver Island; also in the Bow River, Kananaskis Falls, Rocky Mountains.

G. platyphylla, Mitt. On rocks along Peace River. Lat. 56° 25′.

G. maritima, Turn. On rocks exposed to the spray of the sea, Vesuvius Bay, Salt Spring Island, Gulf of Georgia; also on rocks at Hastings, Burrad Inlet, B. C.

G. anodon, Bruch & Schimp. On dry rocks at Morley, Rocky Mountains; and at Lytton, B. C.

G. plagiopodia, Hedw. On sandstone rocks along Peace River. Lat. 56° 25′.

G. pulvinata, Smith. On rocks, Mount Erskine, Salt Spring Island, Gulf of Georgia; common at Lytton and Blackwater River, B. C.

(*To be continued.*)

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XII.

(Continued from p. 60).

Miconia fulva (Rich.), DC. Prodr. iii. 180. Falls of the Madeira, Brazil (2290).

Miconia dolichorhyncha, Naud. l. c. xvi. 166. Guanai, 2,000 ft.; (2252).

Miconia annulata (Naud.), Tri. l. c. 121. Yungas, 6,000 ft. (2272; 2295); Yungas, 4,000 ft. (2285).

Miconia livida, Tri. l.c. Yungas, 6,000 ft. (2296); Guanai, 2,000 ft. (2548).

MICONIA ELONGATA, Cogn. sp. nov. (Sect. *Amblyarrhena*); glaberrima; ramis subacute tetragonis; foliis breviter petiolatis, elongato-lanceolatis, longiuscule acuminatis, inferne alternatis acutisque, integerrimis vel tenuissime remotesque denticulatis, triplinerviis vel subtrinerviis; paniculis mediocribus, pyramidatis, multifloris; floribus 5-meris, breviter pedicellatis, ebracteolatis; calycis tubo ovoideo, limbo leviter dilatato, lobis late triangularibus, brevissimis; antheris oblongo-linearibus, connectivo postice brevissime calcarato; stigmate peltato.

Rami robustiusculi, pallide cinerei. Petiolus 1-1½ cm. longus. Folia submembranacea, 17-20 cm. longa, 3½-5 cm. lata, nervis subtus valde prominentibus, nervulis numerosis, coloratis. Paniculæ 7-8 cm. longæ. Pedicelli 1-2 mm. longi, ad medium articulati. Calyx fuscescens, 1½ mm. longus. Petala obovata, ¾ mm. longa. Staminum filamenta capillaria, geniculata, 1½ mm. longa; antheræ ⅔ mm. longæ. Stylus 2-2½ mm. longus. Yungas 6,000 ft. (2283).

Miconia Ruizii, Naud. l.c. 192. Yungas, 6,000 ft. (2308).

Miconia plumifera, Tri. l.c. 124. Unduavi, 8,000 ft. (2331).

Miconia papillosa (Desr.), Naud. l.c. 316. Beni River (2305); Guanai, 2,000 ft. (2313).

Miconia cremophylla, Naud. l.c. 228. Yungas, 6,000 ft. (2266).

Miconia cœlestis (Don), Naud. l.c. 245. Mapiri, 5,000 ft. (2279), det Cogniaux; Unduavi, 8,000 ft. (2284); Mapiri, 2,500 ft. (2261), the latter determination somewhat doubtful.

Miconia cyanocarpa, Naud. l.c. 221. Mapiri, 2,500 ft. (2274). Det. Cogniaux.

MICONIA BRITTONII, Cogn. sp. nov. (Sect. *Cremanium*); ramis obscure tetragonis, junioribus petiolis paniculis calycibus foliisque subtus ad nervos pilis brevissimis patulis papillosis densissime hirtellis; foliis breviter petiolatis, anguste ovatis, basi subrotundatis, apice obtusiusculis, remotiuscule breviterque aculealato-denticulatis, 5-plinerviis, supra brevissime subsparseque strigillosis, subtus brevissime et densiuscule villosis; paniculis mediocribus, thyrsoideis, multifloris; floribus sessilibus, minute bracteolatis, subfasciculatis, calycis lobis anguste ovatis, acutis, tubo dimidio brevioribus, antheris parvis, biporosis, anguste obovoideis; stigmate peltato.

Rami robustiusculi, cinerei. Petiolus robustus, 1-2 cm. longus. Folia rigidiuscula, subtus cinerea, 12-16 cm. longa, 6-7 cm. lata, nervis subtus valde prominentibus. Paniculæ satis ramosæ, 8-10 cm. longæ. Calyx cinereus, tubo ovoido-campanulato, 1½ mm. longo, lobis ⅔ mm. longis. Petala ovato-oblonga, subacuta, 1 mm. longa. Stylus filiformis, 1½ mm. longus. Aff. *M. cyanocarpa*, Naud. Yungas, 4,000 ft. (2309), Det. Cogniaux. Mapiri, 5,000 ft. (2292), Det. N. L. B.

MICONIA POLYGAMA, Cogn. sp. nov. (Sect. *Cremanium*); ramis obtuse tetragonis, superne leviter compressis junioribus petiolis, paniculis foliisque subtus ad nervos pilis patulis brevibus apice stellulato, ramosis, densiuscule hirtellis; foliis longiuscule petiolatis, ovatis, breviter acuminatis, basi rotundatis, integerrimis vel obscure undulato-denticulatis, 5-7-nerviis, supra minute subbullatis, subtus leviter foveolatis, utrinque brevissime subsparseque hirtellis; paniculis mediocribus, pyramidatis, multifloris, compactis; floribus 5-meris, subdioicis, sessilibus vel brevissime pedicellatis, bracteolis subulato-setosis suffultis; calyce glabro, ovoideo, minute 5-denticulato; antheris late obovoideis, apice truncatis et late biporosis; stigmate peltato.

Rami graciles, cinereo-fusci. Petiolus satis gracilis, 3-5 cm. longus. Folia submembranacea, 8-11 cm. longa, 5-8 cm. lata. Paniculæ 6-8 cm. longæ. Flores interdum omnes masculi, interdum plerumque feminei rarius hermaphroditi. Calyx 1½ mm. longus. Petala late ovata, ⅔ mm. longa. Stamina alternatim satis inæqualia, filamentis capillaribus, ¾-1 mm. longis; antheræ ⅔ mm. longæ, connectivo tenuissimo, basi longe producto. Stylus filiformis, 2½ mm. longus. Bacca nigra, subglobosa, 3 mm. crassa. Guanai, 2,000 ft. (2519 ♂); Unduavi, 8,000 ft. (2282 —sub ♀).

MICONIA RUSBYANA, Cogn. sp. nov. (Sect. *Cremanium*); ramis obscure tetragonis, glabris; foliis breviter petiolatis, lanceolatis, subacute breviterque acuminatis, inferne longe attenuato-cuneatis, integerrimis, triplinerviis, supra ad nervum medianum brevissime hirtellis cæteris glabris et scabriusculis, subtus glaberrimis; paniculis mediocribus, late pyramidatis, multifloris, densiuscule breviterque hirtellis; floribus 5-meris sessilibus, ebracteolatis, subfasciculatis; calyce glabro, subhemisphærico, brevissime 5-denticulato; antheris late obovoideis, apice truncatis et latissime biporosis.

Rami graciles. Petiolus gracilis, 1-2 cm. longus. Folia membranacea, 1-1½ dm. longa, 3-4 cm. lata, nervis nervulisque subtus satis prominentibus. Paniculæ 8-10 cm. longæ, ramis patulis, elongatis. Calyx 1 mm. longus. Petala obovato-angulata, ¾ mm. longa. Staminum filamenta capillaria, 1-1½ mm. longa; antheræ ⅔ mm. longæ, connectivo tenuissimo, basi longe producto. Stylus ignotus. Yungas, 6,000 ft. (2259).

MICONIA FLAVESCENS, Cogn. sp. nov. (Sect. *Chænopleura*); ramis teretiusculis, junioribus petiolis paniculis foliisque subtus ad nervos brevissime denseque furfuraceo-papillosis et ferrugineis; foliis breviuscule petiolatis, ovato-oblongis, acutis, basi rotundatis, margine remote minuteque spinuloso-denticulatis, trinerviis, supra glabris, subtus primum leviter, punctato-furfuraceis demum glabratis, paniculis parvis, paucifloris; floribus 5-nervis, breviter pedicellatis, ebracteolatis; calyce glabro, subhemisphærico, minute remoteque 5-denticulato.

Rami graciles, breves, ramulosi. Petiolus 1-2 cm. longus. Folia rigidiuscula, utrinque flavescentia, 5-7 cm. longa, 2-3 cm. lata, nervis subtus satis prominentibus, nervulis paulo distinctis. Paniculæ 2-4 cm. longæ, paulo ramosæ, pedicelli graciles, 1-3 mm. longi. Calyx siccitate nigricans, 2 mm. longus, 3 mm. latus. Aff. ***M. andina***, Naud. Unduavi, 10,000 ft. (2288).

Miconia andina, Naud. l. c. 236. Unduavi, 8,000 ft. (2286).

Miconia Mandoni, Cogn. in Herb. Kew. Unduavi, 8,000 ft. (2287). The same as Mandon's No. 646.

Miconia nervosa, (Smith), Tri. l. c. 111. Yungas, 6,000 ft. (2280). Junction of the rivers Beni and Madre de Dios (2291).

Miconia eriodonta, DC. l. c. 185. Yungas. 4,000 ft. (2726).

Miconia rubiginosa, (Bonpl.), DC. l. c. 183. Yungas 6,000 ft. (2300); Mapiri 5,000 ft. (2298); the latter a form with long acuminate leaves.

Miconia Fothergilla, (DC.), Tri. l. c. 119. Mapiri 5,000 ft. (2293).

Miconia persicariæfolia, Cogn. Guanai, 2,000 ft. (992); det. Cogniaux.

Miconia caulescens, DC. Mapiri, 5,000 ft. (2256). Matching specimens so named in Herb. Kew.

Miconia Boliviensis, Cogn. Unduavi, 8,000 ft. (2260). Det. Cogniaux.

Miconia novemnervia, Naud. l. c. 217. Mapiri, 5,000 ft. (2316).

Miconia lanata, (DC.), Tri. Falls of the Madeira, Brazil. (2303).

Miconia holosericea, (L.), Tri. l. c. 101. Guanai, 2,000 ft. (2250); Mapiri, 5,000 ft. (2297).

Miconia, "parait une nouvelle espèce, mais trop incomplet pour le decrire; aspect du *M. polyneura*, Tri. mais distinct"—Cogniaux. Yungas, 6,000 ft. (2263).

Miconia, "espèce peut-etre nouvelle?"—Cogniaux. Mapiri, 2,500 ft. (2275).

"*Miconia ou Leandra?* espece nouvelle"—Cogniaux. Yungas, 4,000 ft. (2334).

Tococa Guianensis, Aubl. Pl. Gui. i. 428. Beni River (2242).

Tococa coronata, Benth. in Hook. Journ. Bot. ii 303. Junction of the rivers Beni and Madre de Dios, (2321). A variety with thin, membranaceous leaves, perhaps a distinct species.

Clidemia hirta, (L.), Don. Mem. Wern. Soc. iv. 309. Falls of the Madeira, Brazil, (2239, 2240). Mapiri, 5,000 ft. (2236).

Clidemia dependens, (Pav.), Don. l. c. 307. Mapiri, 5,000 ft. (2237).

Clidemia rubra, Aubl. Mapiri, 5,000 ft. (2318); Mapiri, 2,500 ft. (2319).

CLIDEMIA BOLIVIENSIS, Cogn. sp. nov. (Sect. *Staphidium*, Cogn. Fl. Bras.); ramis teretiusculis, junioribus petiolis pedunculisque pilis longissimis patulis mollibus subsparse hirtellis; foliis majusculis, anguste ovatis, longiuscule acuminatis, basi inæquilateris et rotundatis vel leviter emarginatis, levita undulato-crenulatis, 5-nerviis, supra breviuscule sparseque pilosis, subtus sparse longeque hirtellis præcipue ad nervos; cymis brevibus, 3-5 floris; calyce leviter furfuraceo et sparse longeque piloso, tubo oblongo, lobis brevissimis, dentibus exterioribus subulatis, tubo sublongioribus.

A New White Smut.

While making a study of the parasitic fungi of the cultivated spinach (*Spinacea oleracea,*) it was a surprise to find a species of *Entyloma*, and especially as this host is so distant in the natural classification of plants, from any other host of a white smut. The infected leaves had lost all their normal green color and were of a pale yellowish white shade—in fact, presented much the same appearance as succulent foliage may take on after having been frost bitten some time before. Upon a closer examination, however, the surface of the whitened leaves was found coated in spots with a fine light substance that under the hand lens was seen to be in minute tufts. The low power of a compound microscope revealed these miniature rosettes as consisting of slender filaments bearing acicular bodies at their tips. Thin transverse sections of these infected patches showed small clusters of spherical spores imbedded in the leaf tissue, but close to the under epidermis. Further study demonstrated the fact that the clusters—each consisting of from a dozen to fifty spores, were located directly below the breathing pores and occupied the large intercellular spaces there found in the loosely constructed succulent leaf of the spinach. Placing a piece of the infected leaf, after being cleaned by alcohol and potash, with the underside uppermost and focussing, it was an easy matter to pass by optical sections from the highest part of the conidial bearing tuft to the center of the cluster of spores below. Carefully made sections through the breathing pores bearing the fungus illustrated the same disposition of the parts as seen in a side view. The threads of the fungus are exceedingly minute, and the conidia are so small and slender that they are easily overlooked unless high powers are employed. It gives me pleasure to dedicate the species to Mr. J. B. Ellis, who has done so much for the cause of mycological study in this country. The following is a description of the white smut of the spinach.

ENTYLOMA ELLISII. Spots pale white, indefinitely limited, sub-confluent; spores globose nearly colorless 16-20μ in diameter, clustered in the intercellular spaces beneath the stomata. Conidia hypophyllous, abundant, acicular, small 10-14 by less than 1 μ. On cultivated spinach growing in hot beds near Newark, New Jersey, January 10, 1890.

The white smuts, or Entylomata, are neither numerous nor particularly destructive, as a rule, to their hosts, and if they are, it is often a blessing to the crop grower, for the hosts are mostly insignificant or weedy plants. Saccardo[*] enumerates thirty-six species, while Winter[†] stops at half that number. The following are the species found in this country: *Entyloma microsporium*, Schrt. on *Ranunclus repens.*—*E. Thalictri*, Schrt. on *Thalictrum dioicum*. *E. Lobeliæ*, Farl. on *Lobelia inflata*. *E. Linariæ*, Schrt. on *Veronica peregrina*. This last species was found by the writer last autumn upon *Linaria vulgaris*, in New Jersey, and is probably the first time it has been thus met with in this country. An opportunity was therefore offered to compare this species (which agrees with foreign specimens kindly loaned me by Mr. J. B. Ellis) with the form so abundant upon and sometimes so destructive to the *Veronica peregrina*. As Entylomata go, there are some marked differences between the two; the most important of which are in the size and shape of the spores. Those upon the *Veronica* are darker and much larger than the typical form of the *Linaria*. While the latter has the spores 9-12μ by 11-14μ those of the *Veronica* are 12-15μ by 17-20μ. The mature sori are consequently darker in the *Veronica*, and other differences are noticeable which, were the spores alike, might be accounted for, possibly, as host peculiarities. The *Entyloma* of the *Veronica* appears in early spring—a matter of necessity, as the host is short-lived—while the one upon the *Linaria* matures in autumn. There may not be sufficient ground for a separate species, but it seems proper that a form at least should be recognized as follows: *E. Linariæ*, forma VERONICÆ, nov. forma on *Veronica peregrina* with the differences as above stated.

Other American Entylomata are *E. Menispermi*, F. & T. on *Menispermum Canadense*; *E. Physalidis*, Wint. on *Physalis* sp. and *Solanum triflorum*; *E. polyspermum*, Fl. on *Ambrosia trifida*; *E. Saniculæ*, Pk. on *Sanicula Marylandica*; *E. Compositarum*, Fl. on *Aster puniceus*, *Ambrosia artemisæfolia* and *Rudbeckia laciniata*; and *E. Flœrkeæ*, Holw., on *Flœrkea proserpinacoides*.

It will be seen from the above that the spinach *Entyloma* is the only one in this country that has been found upon a cultivated plant. In Europe one species (*E. crastophilum*, Sacc) occurs on the orchard grass (*Dactylis glomerata*) while *E. Calendulæ* D.By. is sometimes met with upon the marigold (*Calendula officinalis*) and arnica (*Arnica montana*). The leading orders bearing white smuts are: Ranunculaceæ, Papaveraceæ, Compositae, Boraginaceæ and Gramineæ, and the one upon the spinach, introduces a new host-order and one that at present is surrounded by those not known to contain any species attacked by an *Entyloma*.

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[*] *Sylloge Fungorum*, vii. pp. 487–496.

[†] Die Pilze, i. pp. 111–116.

BYRON D. HALSTED.

RUTGERS COLLEGE, March 24, 1890.

The New Edition of Gray's Manual.

Prof. Porter's criticism of the new edition of Gray's Manual, which was admitted into the last number of the BULLETIN, is written in a spirit so unworthy of him that self-respect on the part of the editors of the Manual would ordinarily forbid a reply. There are some statements, however, which I desire to make in relation to the work, some of which touch more or less closely upon points that Prof. Porter has referred to. As for most of the questions propounded by him, so far as I understand their bearing, anyone who has taken the trouble to read the preface will need little further answer.

The different editions of the Manual have contained the following numbers of pages: the first 782, the second 791, the third 746, the fourth 890, the fifth 742, and the sixth 818. The Mosses and Liverworts were included in all the previous editions excepting the third and fifth, the third and fourth including also the "Garden Botany." The Mosses, etc., were dropped from the fifth edition in the expectation that a supplementary volume would be prepared to cover them and perhaps other cryptogams. This hope has been fulfilled only in part by the publication of the Manual of Mosses by Lesquereux and James.

In the present edition, notwithstanding the extension of the territory, and with the inclusion again of the Hepaticæ, with other material which it seemed advisable to add, an effort has been made to avoid an increase in the bulk of the volume. Economy of space has been studied at every point where it was justifiable. Electrotype plates for the illustrations have been substituted for the original stones and copper plates, which has permitted their printing upon thinner paper and the placing of the explanations opposite the plates to which they refer. A thin but firm paper has been used for the whole volume, and the result as respects bulk is that, the book is both thinner and lighter than even the last edition.

In the elaboration of the matter that has been admitted it was, of course, impossible to please everyone. What appears a fault to one will be an excellence in the judgment of another. In the portions that had not recently been revised by Dr. Gray himself the work is necessarily unequal, inasmuch as some orders have been subject to more or less thorough and trustworthy revisions by various botanists, while others have had no especial attention given to them for years. It was necessary to make the best of what was at hand, and this has been done as far as the limited time permitted, every known available source of information up to the very latest date being made use of, and no little original work intercalated where it seemed most needed. All the conclusions and determinations that have been published have not, however, been adopted, for what seemed in each case to be good reasons. A case in point is one referred to by Prof. Porter in regard to *Gentiana alba*, Muhl., a name which he considers that he has "clearly proved untenable." But a careful consideration of the whole question, including a reference to Muhlenberg's manuscripts, convinced me that Dr. Gray's conclusion was probably the more correct one.

The undue multiplication of varieties has not been favored. Everyone must understand that species vary, some more and some less, but all to some extent. The attempt to define and name these variations is in the great majority of cases of little profit, especially in a manual like the present.

The determination of the range of species was often a difficult and unsatisfactory matter. Numerous local catalogues, more or less reliable, the Gazette, THE BULLETIN, the Gray Herbarium, were at hand and were consulted whenever there seemed occasion for it. That there should be not a few errors of various kinds is not strange, and I am not at all surprised that the keen scent of

Prof. Porter has enabled him to draw up a list of sixty, though more than half of the cases mentioned by him are fairly covered by the range as now given in the Manual. Botanists will not be greatly troubled in this regard, I think, if they will give common sense fair play, and consider that when the range is given from New England to Minnesota, for example, the limit is not to be taken as a mathematically straight line connecting the two, and when a plant is said to be common, that it may be more common in some sections than others, or may even be wholly wanting in some areas.

Some additional facts respecting distribution that were overlooked or at the time unknown may here be given. *Caltha natans*, Pall., not previously known as belonging to our flora, has been collected by Mr. E. J. Hill, at Tower, Minnesota. *Dianthus deltoides* occurs on the downs of Martha's Vineyard (Miss Edith Watson); *Sagina procumbens*, at Champion, Michigan (E. J. Hill); *Solidago neglecta*, var. *linoides*, at Turner, Maine (John A. Allen); *Ruellia pedunculata*, Torr., should be added, found at De Soto, Mo., by Dr. H. E. Hasse.

Typographical errors, and the like, are unavoidable. Attention is called to a few of some importance. On page 19, the cross-reference should be to page 5. On pages 62 and 63 the genera referred to in the headings of the key should be n. 2, n. 5, and n. 11, instead of n. 3, n. 4, and n. 10. On page 98 the root of *Callirrhoë triangulata* should be described as fusiform. On page 145, read *Ammannia latifolia*. On page 375, read Independence, Mo. On page 383, the upper lip of the corolla of *Conobea* is 2-lobed. On page 441, for *Lurs* read *Leers*. On page 470, Sweet-fern is omitted as the common name of *Myrica asplenifolia*. *Prunus* is omitted from the Index, and Plate 15 is referred to in the text uniformly as Pl. 16. These errors will be corrected in the next issue.

The editors of the Manual have been neither omniscient nor infallible. But they have tried to do their best, and knowing something of the book, I will for myself frankly say that I look upon it, as it stands, as a piece of "good work," and I confidently believe that it will be appreciated as such more and more by botanists who may use it. SERENO WATSON.

A New Moss of the Genus Bruchia.

(PLATE CI.)

BRUCHIA LONGICOLLIS: Cæspitosa, pro genere robusta, monoica; foliis late ovatis laxe areolatis in costam validam subcanaliculatam longissime excurrentem contractis, perichætialibus longioribus lanceolatis convolutis excurrenti–costatis; capsula pedicello folia subduplo superante suffulta collo longissimo prædita ovali oblonga infra rostellum tenue serie transversali cellularum breviorum notata atque idcirco dehiscentiam stegocarpicam simulante; calyptra campanulata basi in segmenta 3-4 fissa; sporis numerosissimis asperulis .0012-.0114 unc. metientibus.

Discovered in August, 1889, by Mr. Alexander W. Evans, of the Sheffield Scientific School, growing in little patches on a decayed log in a swamp in the town of Jackson, New Hampshire.

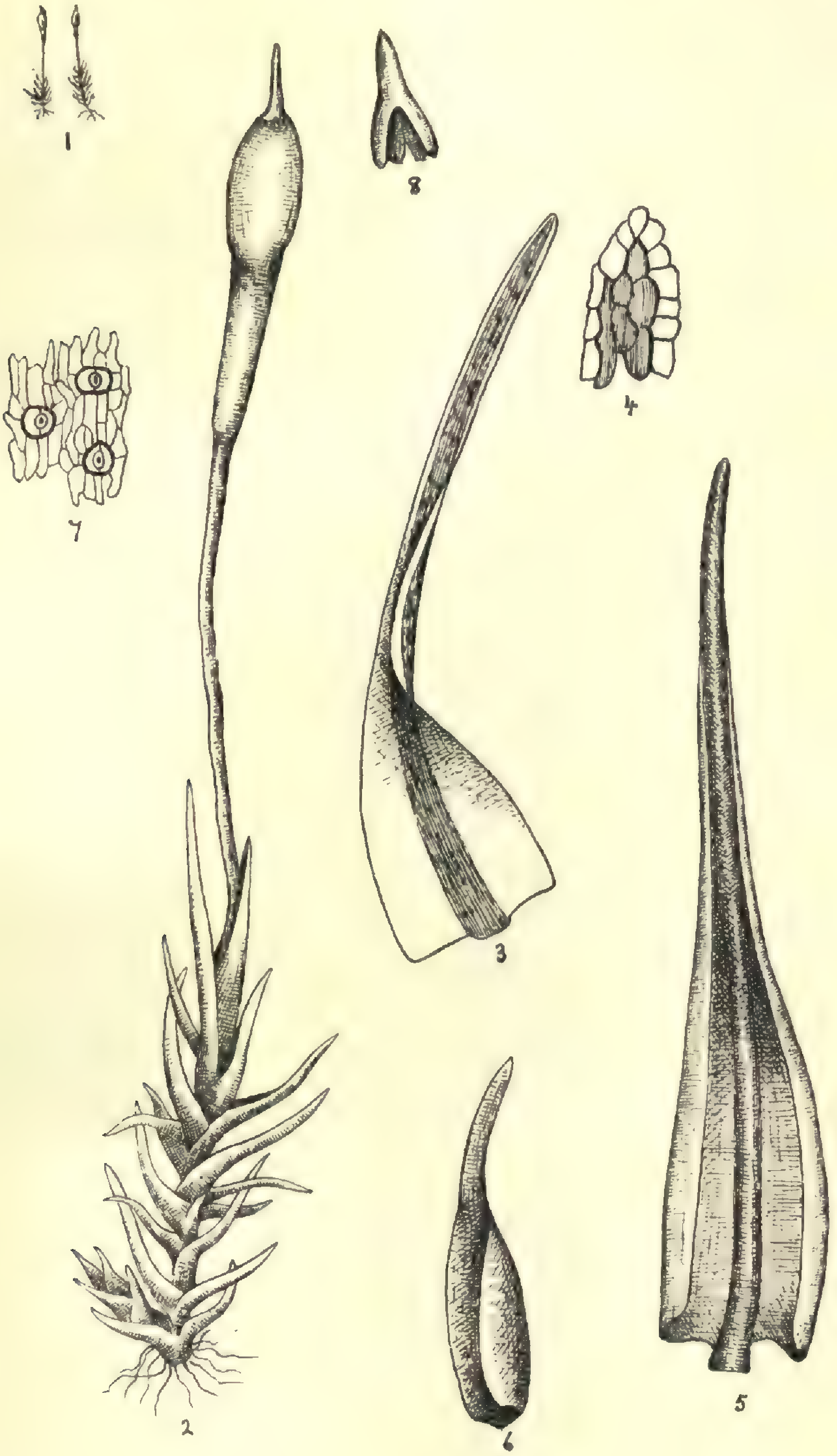
Plants densely clustered, 7-10 mm. high.

Stem leaves suddenly narrowed from a broadly ovate clasping base into a long excurrent awn-like costa, which is in the lower part narrowly bordered by the leaf-margin. Perichætial leaves 3-4, longer than the others, lanceolate, somewhat tubulose from the incurved margins, gradually acuminate, costa excurrent.

Capsule on a stout pedicel which overtops the perichætial leaves, oblong-oval, orange-yellow, below suddenly narrowed into a collum longer than the capsule itself, above contracted into a slender beak. Collum with abundant stomata. The beak is composed of nearly regular rows of oblong cells which are shorter at the base, and this rests on several rows of minute cells, the whole forming an inseparable operculum.

Male flowers terminal on short basal branches of the plant, the perigonial leaves concave with a short faintly-nerved acumination; antheridia not clearly seen.

This is a stouter plant than either *Bruchia Bolanderi* or *B. Vogesiaca*, both of which it somewhat resembles. The strong excurrent costa of the leaves, the very long and conspicuously stomatiferous collum, and the rudimentary line of dehiscence of the capsule, will serve to distinguish it from both of them, and at the same time indicate a closer approximation to the characters of *Trematodon*, to which genus the specimens were referred at the first cursory glance.



BRUCHIA LONGICOLLIS, D. C. Eaton.

DESCRIPTION OF THE PLATE.

Fig. 1.—Two plants, 1½ nat. size.
2.—A plant, magnified.
3.—A stem leaf.
4.—Tip of stem leaf.
5.—Perichætial leaf.
6.—Perigonial leaf.
7.—Stomata of collum.
8.—Calyptra.

D. C. EATON.

NEW HAVEN, February, 1890.

Notes on Some of the Plants Found in Muskoka Lake, Sept. 1st, 1889.

The Range of Subularia aquatica. In regard to the range of *Subularia aquatica*, whose North American stations formed so interesting a communication in the November BULLETIN, Bentham in his "Handbook of the British Flora," gives:—

"The shallow edges of alpine ponds and lakes, in northern Europe, Asia, and America, and more rarely in central Europe. Scarce in Britain, in the mountains of Scotland, northwestern England, and north Wales." In the second edition of Withering's Botany, 1787, it is said that the *Subularia aquatica* grows under water on a gravelly bottom in Lough Neagh, Ireland, on the side next Kilmore, Ray; Loch Tay and Loch Carran, Scotland. Mr. Stuart; in lakes on the mountains near Llanberrys. Hudson; and Llyn-y-Cwn, near Snowdon, Pennant."

Lobelia Dortmanna is found abundantly in the shallow parts of the lakes in the north and northwest of Great Britain, especially in the mountain regions; often, according to Hooker and Arnott, forming a carpet at the bottom of the water with its densely matted foliage.

In the southeast corner of Derwentwater, at intervals ranging from a few weeks to ten years, a blister-like upheaval of the peat occurs, bringing the bottom of the lake up from six feet beneath to a few inches above the surface of the water. A careful examination of this popularly called floating island, reported in a recent history of it by Mr. G. J. Symons, shows its surface to be covered with living specimens of *Lobelia Dortmanna*, L., *Isoetes lacustris*, L. and other water plants that abound in the lake.

Eriocaulon septangulare. The genus *Eriocaulon*, with the exception of *E. septangulare* in the lakes of the isles of Skye, and a few of the neighboring Hebrides, and of Connemara, in Ireland, is wholly wanting in Europe and Russian Asia. The genus extends over North and South America almost from pole to pole, and is well represented in tropical Asia, Africa and Australia, (Bentham). Withering (1787) gives the stations of *E. septangulare* in the isle of Skye, with great detail, stating that it was discovered in two or three small fresh water lochs in 1768. In one of these he says that it occurred in such abundance that "the white fibres of the roots are thrown on the edges of the loch as sea-weeds on the sea-shore."

K. B. CLAYPOLE.

Botanical Notes.

Subularia aquatica, L.—Dr. J. W. Chickering, under date of November 16th, 1889, writes as follows: "In 1858, I discovered *Subularia* in abundance about two miles west from Portland, Me., along the line of the old Portland and Sebago Canal, on muddy banks caused by the washing out of the canal, and collected a quantity. Two or three years after, I visited the locality, and although the environment was in all its conditions unchanged, I could not find a trace of it."

DAVID F. DAY.

Note upon Ailanthus.—In connection with Mr. A. F. Wood's observations on the Cottonwood, reviewed in the February BULLETIN, page 43, it may be said that during the past season repeated observations were made upon the Ailanthus, (*Ailanthus glandulosus*, a well-known shade tree in the Eastern States, in order, if possible, to obtain some means by which to distinguish the staminate from the pistillate plants while they are seedlings. As yet nothing has been discovered in wood or bark, bud or leaf, that will give any clue as to the sex. There are great differences as to time of leafing and defoliation between trees of this species growing apparently under the same circumstances, but the sex seems to have nothing to do with this. In fact, it is not uncommon for species of trees with perfect flowers to exhibit as great variations, in these and many other respects, not to exclude the striking one of foliage coloration in autumn.

The value of some distinguishing sex characteristic in the case of seedling Ailanthus trees, could it be found, would be appreciated by all who are acquainted with these ornamental trees. To others we need only to quote a line from Dr. Gray: "Called Tree of Heaven—but whose blossoms, especially the staminate ones, are redolent of anything but 'airs from heaven.'" It is needless to say that it is desirable to exclude the males from the city streets.

BYRON D. HALSTED.

New Brunswick, N. J., Feb. 12, 1890.

Burning of the Botanical Museum and Laboratory of the Michigan Agricultural College. On the night of March 23d, our Botanical Laboratory and Museum was destroyed by fire. We were able to carry out and preserve all the books, charts and apparatus, including the mounted portion of the herbarium. The Wheeler herbarium, recently purchased, containing over seven thousand species, including the most complete collection of Michigan plants ever brought together, was lost, together with a part of the electrotypes to illustrate my second volume on grasses. If life and health are spared, we shall have, in a few years, a much better building and a finer museum. For the present, very good accommodations for the botanical department are furnished in a part of the new Agricultural Laboratory recently completed.

W. J. BEAL.

A Munificent Gift. Mary E. Banning, who has for several years been studying the fungi of Maryland and making colored drawings of them, has recently presented to the New York State Museum of Natural History, a magnificent volume of illustrations of the species that have come under her observation. It contains one hundred and seventy-five plates, representing nearly as many species belonging mostly to the Hymenomycetes and Gasteromycetes. The plates are about the same in length as those of the Icones Selectæ Hymenomycetum of Fries and a little greater in breadth. The figures are most beautifully executed, painted in water colors and are very life-like in expression and accurate in detail. They are accompanied by manuscript descriptions of the species, the botanical name, and in some instances by remarks suggested by the study of the specimens or by difficulties encountered in collecting them. The edible species are also indicated. The whole work is the product of Miss Banning's own labor and does great credit to her as an artist and a mycologist. The volume is one of great value, and the New York State Museum is under great obligations to its author for such a munificent gift.

CHAS. H. PECK.

Reviews of Foreign Literature.

White Huckleberries.—In the Berichte der deutschen Botanischen Gesellschaft for January, pp. 387-400, is a paper by Ascherson and Magnus* which considers at length the albinos and other color and form variations in *V. Myrtillus* and other species of the genus *Vaccinium.* White huckleberries have long been known, and many citations are given of their being found in various countries throughout the world. Schweter, in 1878, described a fungus disease of the huckleberry fruit under the name of *Sclerotinia baccarum* that has been considered by some botanists as the cause of the variations of color and form above mentioned. As the title indicates, the present paper is to show that the ordinary white huckleberry is not identical with those *Vaccinium* fruits that are modified by the presence of the *Sclerotinia.* The authors claim with much authority that while in the case of *V. Myrtillus* var. *leucocarpa* there may be some ground for the belief in identity, it is entirely superficial. Form and color may mislead, but when the microscopic structure is studied, and more particularly the fungus fruit that under proper conditions is produced from the diseased berries, it becomes evident that the two are very unlike in origin. By referring to Dr. Woronin's elaborate paper,† with its ten superior plates, it is quickly seen that Schweter's species, under consideration, is well understood and clearly set forth, along with several others that prey upon the huckleberries.

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*Die Weisse Heidelbeere (*Vaccinium Myrtillus*, L. var. *leucocarpa*, Hause). nicht identische mit der durch *Sclerotinia baccarum* (Sch.), Rehm, verursachten Sclerotien Krankheit.

†Ueber die Sclerotien Krankheit der Vaccinieen Beeren, 1888.

Turning to the other side, it may be said that there are great variations in the color and form of the fruit within the genus *Vaccinium.* Our own *V. corymbosum*, var. *atrococcum* is an illustration of "berries purple black, without any bloom," while *V. Pennsylvanicum*, var. *nigrum* is another with black fruit, and the cranberries exhibit a wide range of fruit colors. While it is true that in some cases the fruits, changed by fungi, may resemble those of albinos and "sports," it is also evident that no great difficulty should be experienced in deciding between the two. For example, we could suppose a rye grain to vary and become of a dark purple color and pass for ergot, but put to the test the deception is easily removed. BYRON D. HALSTED.

Chrysanthemum "*Samuel Henshaw.*" (Garden, xxxvi. 381). As our fellow member is responsible for the origin of this *Chrysanthemum*, the Club will no doubt be pleased to know that it is attracting considerable attention in England, and it is said that "should the variety Samuel Henshaw turn out to be as valuable as is anticipated by some, it will be another instance of a plant whose merits were overlooked when it was first sent out." We congratulate Mr. Henshaw upon his success. A. H.

Recherches sur la transpiration et l'assimilation pendant les nuits Norvégiennes. M. G. Curtel. (Rev. Gen. de Bot. 15 Jan. 1890).

It is a well known fact that plants of northern regions grow more rapidly and often acquire a larger growth than the same species would with us. M. Curtel's experiments at Kongsvold, Norway, were undertaken for the purpose of ascertaining the extent of transpiration and assimilation during the long, crepuscular nights, and he suggests that one of the causes of the greater rapidity of growth might be the long duration of chlorophyllian assimilation which uninterruptedly might take place during the whole night. The leaves of Rye and *Hieracium Pilosella* were the plants used, and the results of the experiments are summed up in the following:

"1st. That chlorophyllian assimilation and transpiration took place during the whole of the night of July 31 to August 1.

2d. That particularly as to the assimilation, there was a minimum corresponding to the minimum of light." A. M. V.

Index to Recent American Botanical Literature.

Acænas. (Garden. xxxvii. 177, illustrated). A representation of *A. microphylla* is given.

Black Rot of the Grape—The. Chas. R. Carpenter. (Trans. Kans. Acad. Sci. xi. 14–17).

Circulation of Sap—Notes on. W. R. Lighton. (Trans. Kans. Acad. Sci. xi. 18–19).

Clathrus columnatus—Poisonous action of. W. G. Farlow. (Bot. Gaz. xv. 45–46).

The poisonous qualities of several of the Phalloideæ have been the subjects of discussion, in a popular way, on more than one occasion. In this article the above fungus is stated to have proved fatal to hogs in North Carolina.

Cobra Plant—The. F. W. Burbridge. (Garden, xxxvii. 147, illustrated). Includes a picture of *Darlingtonia Californica.*

Coreopsis—The Best Annual. (Garden, xxxvii. 202-203, pl. 742 and figs. in text).

Under this heading are described and figured a number of our native species, among them *C. aristosa, auriculata, cardaminifolia, Drummondi* and *lanceolata* and a colored plate of a dark variety of *tinctoria.*

Diatom Deposit from Artesian Wells at Atlantic City, N. J.—Notes on the Fossil. C. L. Peticolas. (Microscop. Journ. xi. 32, 33). A brief addition to the account published in the BULLETIN, vol. xvi. No. 3.

Diatoms in Boston Harbor, in September, 1889.—*A search for.* Wm. A. Terry. (Microscop. Journ. xi. 35–37).

Darlingtonia Californica. (Gard. Chron. vii. 84, figs. 14, 15).

Ephedra.—Die Arten der Gattung. Otto Stapf. (Reprint, Vol. lvi. Denkschr. Math. Naturwiss. Classe, Kais. Akad. Wiss., 4 to, pp. 112, 5 plates, and map, Vienna, 1889).

The American species *E. multiflora, Torreyana, Californica, aspera, trifurca, Nevadensis, antisiphylitica, Americana, gracilis, Tweediana, triandra, ochreata, dumosa* and *frustillata* are described and all but the latter two figured, so far as the inflorescence is concerned. *E. multiflora* is described as new.

Eriogonum —Species of. (Gard. Chron. vii. 260, pp. 38, 39, 40).

Under the suggestion that many of our *Eriogonums* make good garden plants, thirteen species are mentioned and *E. androsaceum, ovalifolium* and *compositum* are figured.

Eucharis Amazonica. (Gard. Chron. vii. 192, fig. 31).

Flora of Kansas—Personal observations upon. Mrs. A. L. Slosson. (Trans. Kans. Acad. Sci. xi. 19–22).

An earnest appeal for the study and cultivation of the native flora of the State, with interesting instances of the manner in which it has been crowded out in many places by introduced plants. There is a charming, unconscious tinge of sarcasm now and then, as in the following sentence: "A lady once bought of Vick, a dozen seeds of a beautiful foliage plant called 'Snow on the Mountains,' and succeeded in getting half a dozen, perhaps, to bloom just before frost, only to find that the bluffs back of her house, for miles, were just covered with the same flowers, and had been for three months."

Fossil Wood and Lignite of the Potomac Formation. F. H. Knowlton. (Bull. No. 56, U. S. Geol. Survey. Pamph. 8vo. pp. 52, plates 1–7. Washington, D. C., 1889).

The importance of structural investigation in palæobotany is emphasized in this work, both in text and illustration and we heartily agree with the author in this respect. A very brief comparison of a few well known works is all that is necessary to convince any one that the study of superficial characters alone has lead to the most bewildering confusion and waste of energy in describing and renaming the same species many times over. The author begins with a sketch of the progress made in palæobotany from the earliest times, when Albertus Magnus and Agricola first puzzled themselves over the mysteries of petrifaction, to the present era of such magnificent works as those of Brongniart, Gœppert, Unger, Schimper and our own Government and State Reports.

The geological horizon of the Potomac formation is still apparently a subject for discussion and the author fails to state exactly where he places it, although the term Jurasso-Cretaceous would seem to about comprise it. The organic remains are mostly in the blue clay and consist of both lignite and silicified wood. The preparation of these woods for examination under the microscope is described, and finally descriptions and plates of the following new species are given: *Cupressinoxylon pulchellum, C. McGeei, C. Wardi, C. Columbianum* and *Araucarioxylon Virginianum.* Not the least interesting feature is an attempt at classification of the species referred by the author to this latter genus, based upon microscopic characteristics. Undoubtedly good results may be anticipated from further investigation in the field of work undertaken and set forth in this Bulletin. A. H.

Fungus Diseases of the Cranberry—Some. Byron D. Halsted. (Bull. No. 64, N. J. Agric. Exp. Station, December 31, 1889, illustrated).

The cranberry gall fungus (*Synchytrium Vaccinii*) and the cranberry "scald" are the subjects of the author's treatment.

Grasses of Box Butte and Cheyenne Counties, Nebraska. J. G. Smith. (Am. Nat. xxiv. 181-183.)

Grasses of Tennessee.—Key to the Genera of the native and cultivated.—F. L. Scribner. (Reprint from Bull. Tenn. Exp. Sta., pamph., 8vo., pp. 7.)

Guatemala—Undescribed Plants from. VII. John Donnell Smith, (Bot. Gaz. xv. 27-29, pl. iii, iv.)

Oxalis dimidiata, Styrax Guatemalensis, Tradescantia subscaposa, (originally distributed as *Spironema sp.*) *Carpinus Americanus,* Michx., var. *tropicalis, Campanea picturata,* and *Nephrodium duale,* the last two figured, are described as new.—*Asplenium Vera-pax* (see Bot. Gaz. xiii. 77) is in this article referred to *A. Riedelianum,* Bong.—Descriptions are completed of *Hanburia parviflora* and *Solanum olivæforme.*

Haplopappus Baylahuen, C. Gay.—H. H. Rusby. (Reprint from Drug. Bull. February, 1890, illustrated.)

Heather in North America.—The problem of. George L. Goodale. (Garden and Forest, iii. 62, 63,)

The occurence of *Calluna vulgaris* at several stations in the British provinces and New England is described.

Hickoria olivæformis. Carl Mohr. (Pharm. Rundsch. viii. 56-59, illustrated.)

Under this caption the author gives a popular account of *Hicoria Pecan,* with excellent plate.

History of Garden Vegetables.—The. E. L. Sturtevant. (Am. Nat. xxiv. 143-157.)

The contribution contains notes on parsnip chervil, (*Chærophyllum bulbosum.*), patience dock, (*Rumex Patientia.*), pea, (*Pisum sativum*), peanut, (*Arachis hypogæa*), pennyroyal, (*Menttha Pulegium*), peppermint, (*Mentha piperita*), and peppers, (*Capsicum annuum*).

How to Collect and Preserve Botanical Specimens. J. M. Macoun. (Ottawa Nat. iii. 146-149.)

The subject matter of this article was delivered as a popular lecture.

Hypericum Kalmianum. Garden and Forest, iii. 112, fig. 24.)

Kansas Grasses.—An artificial Key to the. W. A. Kellerman. (Trans. Kan. Acad. Sci. xi. 87-101.)

Fifty-six genera including 170 species are enumerated and classified. Wherever there is a common or local name for the species it is appended—an addition of no small interest and value.

Mosses Collected in the Neighborhood of Ottawa.—List of. J. M. Macoun. (Ottawa Nat. iii. 149-152, continued.)

Forty-nine additions to the previous list are here enumerated, with dates and localities.

Nottrocheilus, eine neue Scrophularineen Gattung aus Brasilien, nebst einem Anhange ueber zwei neue Tourvalia Arten. L. Radlkofer (Sitzungsb. k. Bayr. Akad. Wiss. 1889.)

Oaks.—The Waverly. (Garden and Forest, iii. 85, 86, illustrated.)

An account and representation of a remarkably fine group of old trees, mostly *Quercus alba* near the village of Waverly, just outside Boston. A plea is made for the purchase of the land and preservation of the trees.

Pentstemon Menziesii, var. Scouleri. (Gard. Chron. vii. 204, fig, 33.)

Peridial cell characters in the classification of the Uredineæ. H. J. Webber. (Am. Nat. xxiv. 177, 178.)

Peronosporaceæ.—A List of the Kansas Species of. W. T. Swingle. (Trans. Kan. Acad. Sci. xi. 63-87.)

A list of 32 species with both plants and index.

Red Cedar—Savin. J. T. Rothrock. (Forest Leaves. ii. 148, 149, illustrated.)

Contains a full page picture of a large tree of *Juniperus Virginiana* at Wawa, Pa.

Rosa foliolosa. (Garden and Forest, iii. 100, fig. 22.)

Rosin Weed.—An Examination of the resinous Exudation of. L. E. Sayre. (Trans. Kan. Acad. Sci. xi. 103.)

The author states that the gum from *Silphium laciniatum* is completely soluble in chloroform and benzole, which, upon evaporation, leave a transparent residue. Its probable value in microscopic mounting is mentioned.

Sapotaceæ a Dr. A. Glaziou lectæ. C. Rannkiaer. (Videns. Medd. Naturh. Forening Kjobenhavn. 1889.

New species are described in the genera *Mimusops, Sideroxylon, Lucuma* and *Chrysophyllum.*

Stipules in Certain Dicotyledonous Leaves of the Dakota Rocks—On the Discovery and Significance of. F. H. Snow. (Trans. Kans. Acad. Sci. xi. 33-35, illustrated).

The significance refers to the fact that the stipules of these Dakota fossil leaves have a prevailing unilateral position as distinguished from the modern bilateral arrangement, and that they show a gradual change from the solitary entire form to the bilateral pair. Leaves of *Betulites Vestii,* var. *obtusa,* var. *inæquilateralis,* var. *latifolia,* and var. *subintegrifolia* and *Viburnum Dakotense,* var. *longifolium* and var. *ovatifolium,* are figured.

The New American Botanist and Florist. By Alphonso Wood. Revised and edited by Oliver R. Willis. (8vo. pp. 220 + 449. New York, 1889).

The "new" part of this work consists of Dr. Willis's revision of the Lessons, already noted in this journal, bound in with the systematic portion of the old "Botanist and Florist," and as the former are printed in much larger type than the latter, the book has an unequal appearance, and we must add, an unequal value. We think it was hardly fair to call it "new"; we wish it were otherwise. However, the great merit and value of Professor Wood's methods of description have become so widely recognized that the book will remain valuable for many years. There are numerous species that might be added (we note about a dozen in the first 30 pages). There are numerous mistakes that might be corrected, and the nomenclature is bad, although in this respect it is perhaps no worse than the recent edition of its rival manual. Giving, as it does, so large a number of the cultivated plants, with such simple and correct keys to all the species and orders, and extending over the whole eastern United States, it is to-day the most useful school book of its kind in the market.

N. L. B.

Uredineæ—On the Hypophyllous, Epiphyllous, or Amphigenous Habits of. H. J. Webber. (Am. Nat. xxiii. 911-912).

Uredineæ—Peculiar. H. J. Webber. (Am. Nat. xxiv. 178-180 pl. vii).

The author here describes and figures abnormalities in the spores of *Puccinia flaccida*, *P. Prenanthis*, *P. Sporoboli*, *P. Tanaceti*, var. *Actinellæ*, *P. Jonesii*, *P. nigrescens* and *Uropyxis Petalostemonis.*

Viburnum pubescens. (Garden and Forest, iii. 124 f. 26).

Zephyr Flowers. (Garden, xxxvii. 154-155, pl. 740 and fig).

A colored plate of *Zephyranthes candida* and figure of *Z. Atamasco* are given.

Proceedings of the Club.

The regular meeting was held at Columbia College, Tuesday evening, March 11, 1890, the President in the Chair and seventeen persons present. Dr. Britton was elected Secretary pro tempore.

Dr. Newberry read a letter from Mrs. Maria L. Daly, offering to contribute towards the establishment of a botanical garden in Bronx Park, and to further the project in other directions. The subject was remarked upon at length by Dr. Newberry and Judge Brown.

Judge Brown announced the death of Professor Joseph Schrenk, an active member of the Club, which occurred on the morning of March 10, after an illness of several weeks. He remarked on Professor Schrenk's valuable and extended work in Botany and Pharmacy, and his long-continued services to the Club and other institutions. Remarks were also made by Dr. Newberry and the following resolutions were unanimously adopted:

Resolved, That the Torrey Botanical Club has learned with the deepest regret of the death of Professor Joseph Schrenk, one of its most honored and beloved members. During more than fifteen years past, not merely by his active co-operation in the meetings and scientific work of the Club, by his numerous and valuable papers giving the results of his acute and delicate original research, but also by his pure and lofty character as a man, the soul of honor, gentleness and truth he has endeared himself to the hearts of our members.

Resolved, That the profound sympathies of the Club be extended to the family of the deceased and a copy of these resolutions be sent them.

Dr. Newberry read extracts from letters recently received from Dr. Northrop, written at Nassau, Bahama, stating that some 300 species of plants had already been obtained, and that Mrs. Northrop and himself were about leaving Nassau for the island Andros.

The second March meeting was held March 26th in Hamilton Hall, the President in the chair and twenty-four persons present.

Mrs. Maria L. Daly and Miss Henrietta P. Johnson were elected Active Members.

Miss A. M. Vail was elected Associate Editor to fill the vacancy caused by the death of Prof. Schrenk, and Mr. Henry Ogden was appointed to fill the vacancy on the Comimittee on Admissions.

Miss Gregory announced the probable discovery of zöospores in *Oscillaria*, and remarked on the galls found on *Vaucheria*.

The paper of the evening "Notes on Flora of Rhode Island," by Prof. W. W. Bailey then followed.

Death of Dr. Thurber.—Just as this BULLETIN goes to press, the tidings are received of the death of Dr. George Thurber, an ex-president of the Club. A full account of his life and works will appear in an early number.

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BULLETIN

OF THE

TORREY BOTANICAL CLUB.

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Studies in Cell-division.

By Douglas H. Campbell.

(Plates CII. and CIII.)

The following paper was written, not so much as a contribution to our knowledge of the subject, as to call the attention of teachers of botany to several characteristic and accessible examples for demonstrating easily the most essential points in this very important subject.

It is a common idea that the study of cell-division, especially the division of the nucleus, is a very difficult subject for anyone not thoroughly versed in histological methods, and while this is in many cases true, nevertheless it is possible to find cases where these processes can be readily studied with very little aid from reagents, and indeed in some instances followed through in the living cell.

The last ten or fifteen years have seen a great advance in our knowledge of these processes. Up to about 1875, in which year the first edition of Strasburger's "Zellbildung und Zelltheilung" appeared, the general belief current was that of Hofmeister, who believed that in all cases of cell-division the nucleus first became dissolved and that subsequently new nuclei were formed from the cell-plasma previous to the division of the latter. Since the appearance of Strasburger's book the subject has attracted the attention of many of the ablest zoologists as well as botanists, among whom none have done more than Strasburger himself.

The results of these investigations show that every nucleus (with a few doubtful exceptions) arises from the division of a pre-existing one, and that among plants, at least, the origin of a nucleus from undifferentiated protoplasm never occurs.

In the simplest plants, like the Schizophytes, it is probable that in most cases the nucleus substance is not concentrated in the form of a definite nucleus, though such a body has been demonstrated in a number of the larger *Cyanophyceæ.* The latest investigations of Zacharias in this subject leave the question of the presence of nuclei in these forms still open. In these plants, especially those that are truly unicellular, or with cells only slightly coherent, we find the simplest form of fission, a mere constriction of the cell, without any participation of the nuclear substance beyond the mere mechanical separation of the portions in the two daughter cells.

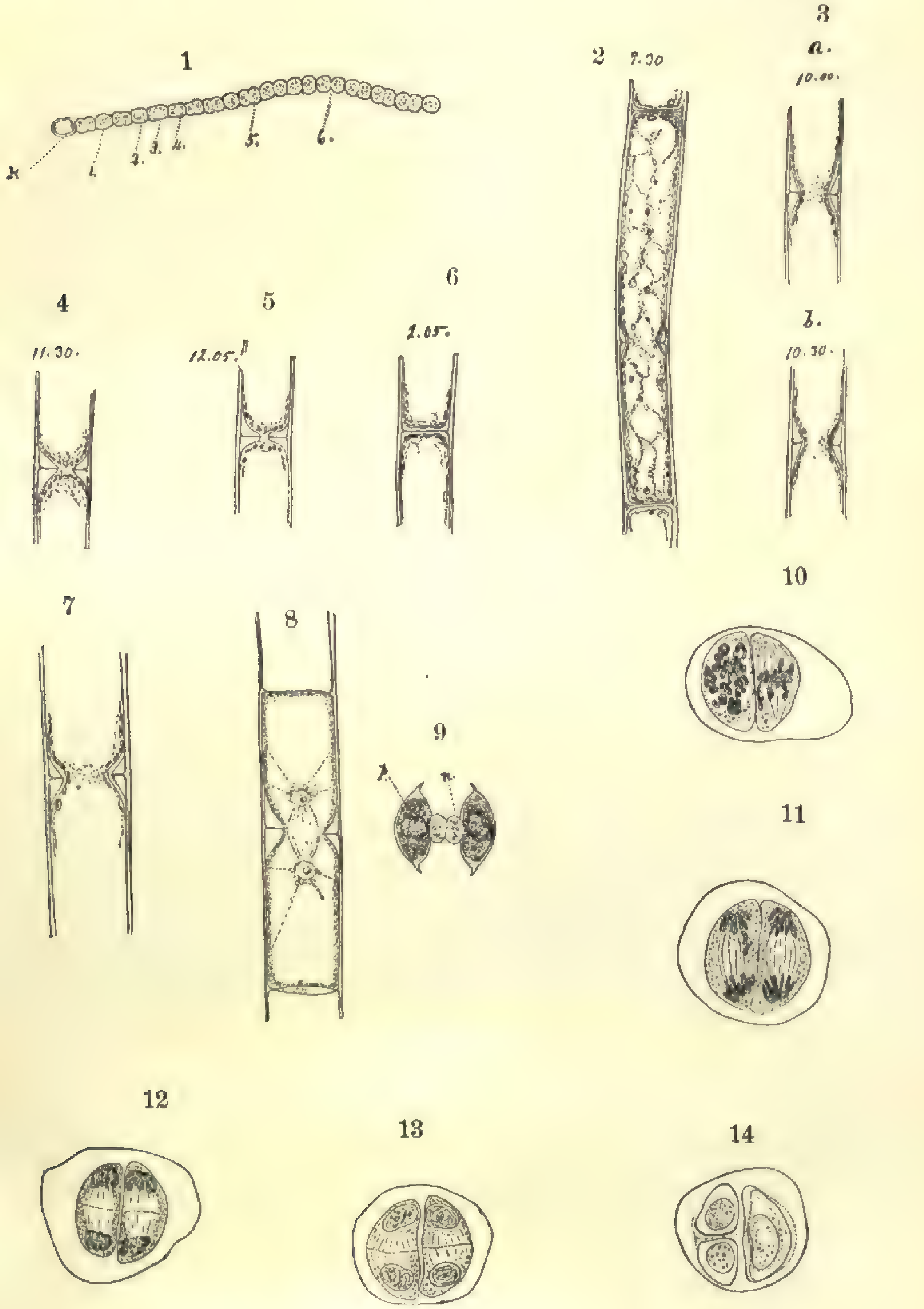
In *Nostoc*, (Pl. CII. Fig. 1) we can usually find filaments in which all stages of cell-division are present, and the process is easily followed. The resting cells, (1), are nearly globular. Previous to division they elongate in the direction of the axis of the filament, (2), and a slight constriction appears in the middle of the cell, (3). Later stages (4-6) show this constriction deeper, until finally the daughter cells are completely separated by the formation of a division wall, and becoming rounded off, assume the form of resting cells.

The first plant in which the process of cell-division was carefully studied, and one of the best for showing simple fission, is *Cladophora.* The common species are found in almost every stream, and may be kept indefinitely in the laboratory.

The cells are multi-nucleate, which may be shown by fixing the cells with one per cent. chromic acid in water, thoroughly washing and staining with borax-carmine or alum-cochineal. The nuclear division is not easily shown, and takes place independently of the cell-division.

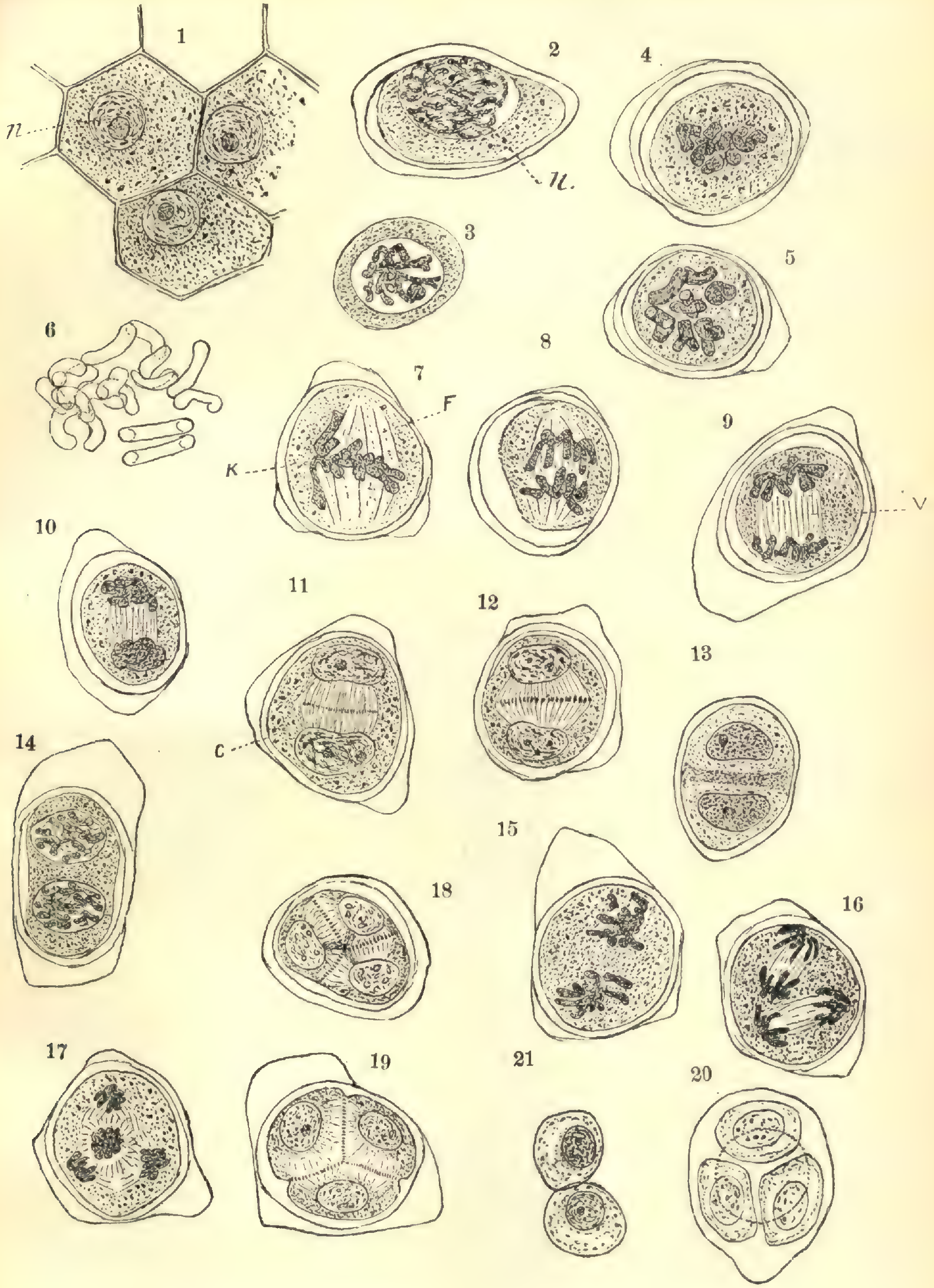
The latter may almost always be found by examining a lot of actively-growing filaments, and when once found may be followed through in the living cell. The later stages may be quickly recognized, even when but slightly magnified, the green contents of the cell being pushed away from the outer wall of the

BULLETIN OF THE TORREY BOTANICAL CLUB. Plate CII.



STUDIES IN CELL-DIVISION. DOUGLAS H. CAMPBELL.

BULLETIN OF THE TORREY BOTANICAL CLUB. Plate CIII.



STUDIES IN CELL-DIVISION. DOUGLAS H. CAMPBELL.

cell by the advancing division-wall. If such filaments are now more strongly magnified and the other cells carefully examined, we shall probably find some in which the process is just beginning. In these (Pl. CII. Fig. 2) the young division-wall appears as a fine ring running around the middle of the cell, its edge directed toward the center of the cell-cavity, and pushing in the protoplasmic sac, leaving an evident clear space between the latter and the side walls of the cell. In larger cells, especially, (Fig. 7) it is very evident that the chloroplasts and other granular contents of the cell, do not occupy the extreme periphery of the protoplasmic sac, but that this is composed of perfectly homogeneous colorless plasma (Ectoplasm).

If we wish to follow the process through in the same cell, it is better to choose a rather small one, as the division does not take so long as in the larger ones. At ordinary temperature (20°-25° C.) the whole process in such cells takes from four to five hours.

The division of the inner granular protoplasm is completed some time before the division wall is closed, so that there is a neck of perfectly colorless protoplasm connecting the two green masses for some time before the connection between the daughter cells is completely severed, (Figs. 4, 5), and for some time after the division is completed the chloroplasts and other granules are contracted away from the division wall (Fig. 6).

Similar to the process just described is what occurs in the different species of *Spirogyra* and similar forms. The great difference lies in the fact that cell-division is accompanied by the division of the single nucleus of the cell.

Cell-division in the various species of *Spirogyra* takes place normally at night, but it may be retarded by suddenly reducing the temperature shortly before the time at which division would ordinarily begin, and keeping the plants in this condition until wanted. In cool weather, when the temperature sinks to near the freezing point at night, it is generally sufficient to keep the plants in a warm room during the day, and at about 10 p. m. to place the vessel containing them out of doors for the night. If they freeze slightly it will ordinarily do little harm. On bringing the plants into the laboratory in the morning, some of the cells will be pretty certain to begin division almost immediately.

The details* of the nuclear changes are not very easy to follow, but such stages as shown in Pl. CII. Fig. 8 are often met with. We find in such the division wall forming in the same way as in *Cladophora*, but near the center of the cell-lumen we find two daughter-nuclei suspended by protoplasmic threads and joined by numerous fine filaments, the outer ones of which are attached to the margins of the advancing division wall. The protoplasmic body of the cell is cut through in precisely the same way as in *Cladophora*, and finally the daughter nuclei move to the centers of the new cells.

The various desmids, especially the forms with constricted cells, show an interesting modification of the process observed in *Spirogyra*. Desmids are especially common on such fine-leaved aquatics as *Naias*, *Nitella*, *Chara*, and especially *Utricularia*, whose finely dissected leaves are often in late summer and autumn loaded down with all sorts of micro-organisms, among which are many of the most beautiful desmids. With a little care these may be kept in glass jars or other convenient vessels and will thrive for a long time. In such cultures they are not infrequently met with undergoing division, which occurs at all hours of the day.

The first sign of approaching division is the elongation of the neck connecting the semi-cells. A circular split in the wall is formed at this point and widens rapidly, forcing the original semi-cells apart, when these appear connected by a slender, colorless cylinder with much thinner walls than the original semi-cell. As this connecting cylinder enlarges it soon becomes constricted in the middle, and a division wall is formed much as in *Spirogyra*, this being accompanied by the division of the centrally placed nucleus. As division proceeds the two halves of the colorless neck enlarge rapidly, forming colorless vesicles lying between the original semi-cells which as yet contain all the colored contents of the cells. (Such a stage is shown in Pl. CII. Fig. 9). Here we find that the single large chloroplast in each half of the original cell is becoming constricted as well as the pyrenoid (p.) imbedded in it, and that the nuclear division is completed. In a somewhat later stage the lower halves of each chloroplast push down into them, and finally separate completely from the part that remains in the old semi-cell.

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*Strasburger—Das Botanische Practicum—p. 612 1st. Edit.

The whole process under proper conditions, is completed in about two hours, but care must be taken that the temperature of the water in which the specimen is mounted is about the same as that from which it is taken. A marked rise of temperature is apt to kill the cells.

For studying the complicated changes that the nucleus undergoes during cell-division, as well as the method of the formation of the division-wall as it usually occurs, we must examine some of the higher plants.

For following the process in the living cell, probably no plant is better than *Tradescantia Virginica.*

Strasburger showed* that the stamen hairs of this plant were especially useful for this purpose, and has described the process so fully in several places that it will not be repeated here. For examination it is only necessary to carefully remove the stamens from young buds and mount them with the attached hairs in water or a weak (three per cent.) solution of sugar in water. It is possible to stain these† without killing them, by using a weak aqueous solution of methyl-violet, dahlia or mauvein but very little more can be seen than in the unstained cells and the process of division is retarded.

For easy demonstration of the process of karyokinesis, the final divisions of the pollen mother-cells, especially of monocotyledons, are the best subjects.

Among dicotyledons which, as a rule, are unfavorable for showing the finer details of the nuclear divisions, *Podophyllum peltatum* is a conspicuous exception, and the process will be described somewhat in detail for this plant, with some reference also to a common and easily studied monocotyledon, *Allium Canadense.* In *Podophyllum* buds should be taken just as the plants appear above ground in the spring. The same young umbel of *Allium* often furnishes different stages, and with a little care all stages may be found, and very satisfactorily shown by the following simple method : The young anthers are removed and carefully crushed in a drop of equal parts ordinary acetic acid and distilled water, placed on a clean slide. The pollen mother-cells will be thus set free in the fluid, which fixes them instantly. The preparation may now be examined with a low power to see if the desired stages are present. If this is the case a drop of staining fluid should be added and a cover-glass placed over the preparation. I have obtained most beautiful results by using gentian-violet. A little of a strong alcoholic solution of this stain is diluted with several volumes of weak acetic acid, (about one part acid to two of water), and a drop of the stain thus diluted is added to the preparation. As soon as the desired stain is produced, which takes but a minute or two, the stain should be carefully drawn off with blotting paper and pure water run under the cover-glass. By this process all the details of division may be easily followed, as the chromatin stains very deeply, while the protoplasm remains almost colorless. Such preparations may be kept for some time in dilute glycerine but soon fade.

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*Strasburger—Hillhouse, Practical Botany—(p. 356).

†Campbell—"Staining of living nuclei," Arbeiten des Bot. Instituts zu Tübingen, 1888.

The isolated spore mother-cells are characterized by their thick, irregular walls, which remain intact until the final divisions are completed. The resting nucleus of the mother-cell is large, and has a very distinct membrane. It shows an indistinctly filamentous structure, and in *Allium* has a large nucleolus at one side which colors but little, and from its position is sometimes known as "para-nucleus." It is probable that the "segments" or chromatin filaments, which later become so distinct, are even in the resting nucleus entirely disconnected, and not confluent as was formerly supposed. In *Podophyllum* the nucleolus is much less conspicuous, and early becomes indistinguishable.

As the nucleus prepares for division it increases very much in size, and the chromatin filaments become much more distinct, appearing as a tangled coil of threads, nearly filling the cavity of the nucleus (Pl. CIII. Fig. 2). These threads do not color evenly, but consist of two substances, one of which does not color at all, and later is scarcely to be seen; the other (chromatin) staining very intensely, and in the earlier stages of division showing more or less distinctly as separate portions (microsomes). These later seem to coalesce more or less completely, so that the segments of the later division-stages stain uniformly and very intensely.

The next stage (Fig. 3) shows the filaments much shortened, and very evident. They color also much more uniformly and lie in the colorless nuclear cavity, which is still separated from the cell-plasm by an evident membrane. The latter soon disappears, however, leaving the short, thick segments free in the center of the cell (Figs. 4, 5). *Podophyllum* is especially favorable for showing this stage and those immediately following, on account of the small number (about ten) of the nuclear segments. These arrange themselves in the form of a disc (nuclear-plate) across the center of the cell (Figs. 4-7K.), and each segment splits longitudinally into two similar daughter-segments, which are usually more or less distinctly bent, often being V-shaped (Fig. 6). Sometimes this division of the segments seems to begin before the disappearance of the nuclear membrane (See Fig. 3).

When the nuclear-plate is complete there may be seen, though this is often difficult in acetic acid preparations, fine lines (Fig. 7F.) converging near the poles of the cell, so as to form a spindle-shaped figure with the nuclear-plate at the equator. The whole constitutes the "nuclear-spindle," and the fibers of which it is composed, the "spindle-fibers" (*Spindelfasern* of the German authors). The spindle-fibers probably correspond in number to the segments of the nuclear-plate, but this is difficult to prove. For studying this point, alcoholic material is preferable.

As soon as the nuclear-spindle is completed the daughter segments separate and travel along the spindle-fibers to the poles of the spindle, (Figs. 8, 9). When viewed from the poles they often show a very regular, stellate arrangement, the V-shaped segments being arranged in a circle with the free ends outward.

As the two sets of segments separate, fine lines may be detected connecting the young nuclei (Pl. CIII. Figs. 8-12 V.) These "connecting threads" (*Verbindungsfäden*) are much more numerous than the spindle-fibers. After reaching the poles, the daughter nuclei pass through much the same phases, but in reverse order, that preceded the division of the primary nucleus (see figs. 10-13). About the time that the nuclear membrane becomes evident, or sometimes a little earlier, a plate composed of small granules appears in the middle of the space occupied by the connecting threads, and careful examination shows them to be knot-like thickenings of the latter (Fig. 11 C.) This structure is the "cell plate," and usually is the beginning of a division wall (Pl. CII. Figs. 12-14). In this case (*Allium*) new connecting threads are formed, running to the circumference of the cell plate, thus increasing its size until finally it reaches completely across the cell (Fig. 13). The separate microsomes of which it is composed now coalesce and form a complete membrane, that divides the mother cell into two. In *Podophyllum* and most other dicotyledons, the primary cell-plate disappears without forming a continuous membrane, though the indication of a division is often evident even after the connecting threads are no longer evident. (Pl. CIII. Fig. 13).

Each of the daughter-nuclei now goes through the same process described for the primary nucleus, but when the ripe spores are arranged tetrahedrally, as in *Podophyllum*, the four nuclei resulting from the final division arrange themselves about the periphery of the cell at equal distances from each other, and connecting threads are formed between them in all directions (Pl. CIII. Fig. 17). A cell-plate is now formed between each pair of nuclei, extending to the center of the cell, thus forming four tetrahedral cells—the young pollen-spores. The division wall is formed in part also by a ridge which projects inward from the wall of the mother cell (Fig. 19). The division walls become finally very thick, so that the young pollen spores appear to be embedded in a thick colorless matrix. This thick wall is finally absorbed, setting free the spores and these soon acquire their characteristic covering.

In *Allium* and most monocotyledons, the spores are of the "bilateral" form, and in these a dividing membrane is formed after each nuclear division. The division of the daughter-nuclei in these frequently takes place in planes at right angles to each other (Pl. CII. Figs. 10, 14).

Direct nuclear divisions (*i. e.*, constriction of the nucleus without any further change) is known in a few cases, but always takes place in the older cells. The older parenchyma cell of the stem of *Tradescantia Virginica* and the internodal cells of *Chara* and

Nitella furnish common instances. They may be treated with acetic acid and gentian-violet as described, in the latter case cutting the long cells across and forcing out the contents with a needle or fine forceps.*

EXPLANATION OF FIGURES.

(Plate CII.)

Fig. 1.—Filament of *Nostoc* × 350.

2–6.—*Cladophora* (sp?) Showing process of cell-division followed in the same cell. Fig. 2, drawn at 9:30 A. M. Fig. 6, 2:05 P. M. × 300.

7 —A much larger cell of the same × 175.

8.—A dividing cell of *Spirogyra* (sp?) × 300.

9.—A Desmid in process of division; n. the nucleus; p. pyrenoid.

10–14.—Final divisions of the pollen-spores of *Allium Canadense*. Acetic acid, gentian violet × 350. In Fig. 10 the nuclear spindle in the left-hand cell is seen from the pole.

(Plate CIII.)

Division of the pollen-spores of *Podophyllum peltatum*. All the figures were drawn from acetic acid, gentian violet preparations, and all but six are magnified about 625 diameters, the latter about 1200.

Figs. 1–13.—Division stages of the primary nucleus of the mother-cell. Figs 5–6 seen from the pole, the others from the side.

14–20.—Division of the secondary nuclei and formation of the spores.

21.—Two young isolated pollen-spores.

N-Nucleus; K–Nuclear-plate; F–Spindle-fibers; C–Cell-plate.

On the Naming of "Forms," in the New Jersey Catalogue.

In a recent number of the BULLETIN, (Vol. xvi. 272) when remarking on Mr. Cockerel's paper on the naming of slight varieties, I stated that I had introduced the term "forma" into the Catalogue of Plants found in New Jersey, as a rank to include physiological deviations or variations, such as color, odor and size, reserving for the term "varietas" such as are manifestly structural. I noted at that place that it was indeed difficult to rigidly separate even these characters, so that very slight structural deviations in the size of organs or their number or amount of division, might best come under the rank of "forma." I think that it is only in the latter sense that the term has been used by European authors, especially of the German school, and in their microscopic habits of thought, attempts have been made to attach

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*See Strasburger-Hillhouse, p. 369 for *Tradescantia*; "Botanisches Practicum," 1st edit. p. 516 for *Chara* and *Nitella*.

" forma " names to structural peculiarities which we would, in our broader view of nature, pass by as mere individual differences. I do not wish it to be supposed that I approve of any such practice. From my point of view the terms " varietas " and " forma " need not be of different value in classification, although in fact, they generally would be. It would be as difficult to decide in some cases between " species " and " forma," as between " species " and " varietas." There are, I believe, no structural differences between *Datura Tatula* and *D. Stramonium*, but they are believed to have originated in different parts of the world, and the color character of the corolla is, so far as I am aware, constant. There is little but the color of the flowers to separate the American *Nasturium lacustre*, Gray, from the European *N. amphibium*. It appears therefore, that the very characters on which I would base " forma," may be quite as constant as morphological ones universally recognized as specific.

This brings up the whole question of what we should agree upon as constituting a " species." There are no fixed lines in nature. The whole vegetable kingdom is so interlocked by the tendency to variation, working simultaneously with the efforts towards atavism and heredity, that structures are continually produced which defy any system of classification. We are forced to admit, and it ought to be further emphasized in our text books, that intermediate forms may occur between any related groups or individuals, or as Prof. Oliver has put it, " no characters are constant." It is, I believe, useless at the present stage of knowledge to argue that all " species " are rigidly distinct and can be separated by carefully drawn descriptions, if once their characters are understood. Some are naturally more permanent than others, but this will not allow of a sweeping generalization.

It ought to be posssible, however, to adopt some considerations which should guide us all in the elucidation of the problem, and this might well form a feature in an extended discussion. But I do not propose to enlarge further on these general matters at the present time. I wish to speak particularly of the instances which have come under my observation in working out the New Jersey Flora, which list is now about ready for distribution.

Anemone nemorosa, L. forma *quinquefolia*, (L.) (*A. quinquefolia*, L. Sp. Pl. 541; *A. nemorosa*, L. var. *quinquefolia*, Pursh, Fl. Am. Sept. 386.) This differs only from the ordinary state of the eastern American plant, called in all recent books *A. nemorosa*, in the lateral leaf divisions being again divided. This is, indeed, the general condition of the radical leaves, and there are all gradations traceable. As a matter of fact, I now regret having ever written it up in this way, but the early signatures of the catalogue being printed, some explanation of my motive should be made. I am now convinced that our plant is distinct from the European, as was long ago forcibly argued by Barton* and should be called *A. quinquefolia*, L.† A long series of European *nemorosa* and Atlantic American *quinquefolia*, seem to me to show remarkably constant differences. The few West Coast specimens referred to *nemorosa* that I have had opportunity to examine seem again distinct from either,‡ while in the plant of the southern Alleghenies which I have seen in Mr. Canby's herbarium, we must have the genuine Central European *A. trifolia*, as indicated by Dr. Gray (Amer. Nat. vii. 422.)

Castalia odorata (Dryand.), Woodv. & Wood, forma ROSEA (Pursh.) (*Nymphæa odorata*, var. *rosea*, Bennett, Rhode Island Catalogue.) Flowers large, pink or purple. It has long seemed to me that this striking and beautiful form of the water lily was entitled to a name. It is very well known to exist at various points along the Atlantic coast from Massachusetts to New Jersey, whence I have specimens collected by Mr. Commons near Cape May, and Dr. Lockwood reports it as growing near Manchester and Woodstown.

Aquilegia Canadensis, L. forma FLAVIFLORA (Tenney). (*A. flaviflora*, Tenney, Amer. Nat. i. 389. *A. Canadensis*, L., var. *Phippenii*, Robinson, Flora Essex County. *A. Canadensis*, L., var. *flaviflora*, Britt. Bull. Torr. Club, xv. 97. This manifestly falls into the rank of forma, and the yellow color appears to be perfectly constant.

Viola pedata, L. forma BICOLOR, (Pursh.) (*V. pedata*, var.

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* Comp. Flor. Phila. ii. 20; Fl. N. A. ii. 10.

† I have so designated it in the Addenda to the New Jersey Catalogue.

‡ *A. Grayii*, Kell. and Behr.

bicolor, Pursh). This also offers very constant color characters, so far as I am informed, but I can make out no structural differences betweeen it and the type.

Viola pedata, L. forma ALBA (Thurber). (*V. pedata*, var. *alba*, Thurber, Bull. Torr. Club, i. 20). Evidently an albino. It occurs with the typical plant, and transitional colors are common.

Viola palmata, L. forma *striata*, Willis, Bull. Torr. Club, xvi. 278. This is the pubescent upland plant, with lobed leaves. In spite of the great amount of work done on our eastern violets, I do not yet believe that they are understood. They can only be known through the accumulation of a great amount of herbarium material, and long-continued field observation. The time of blooming is very different in some of the kinds now referred to *V. palmata*, from which I suspect *V. cucullata* to be abundantly distinct.

Viola cucullata, Ait., forma ALBIFLORA. Flowers white. An albino, not uncommon with the type, or what I take to be the type.

Lupinus perennis, L., forma ROSEA. Flowers beautifully pink. May's Landing, Atlantic Co., Dr. J. E. Peters.

Epilobium spicatum, Lam. forma ALBIFLORUM. Flowers white. North Spring Lake, Lighthipe.

Aralia nudicaulis, L., forma PROLIFERA (A. C. Apgar). (*A. nudicaulis*, L., var. *prolifera*, A. C. Apgar, Bull. Torr. Club, xvi. 166). Described from specimens collected near Lambertville, N. J.; since found by Miss P. A. McCabe at White Plains, N. Y.

Vernonia Noveboracensis, (L.), Willd., forma ALBIFLORA. An albino of occasional occurrence.

Eupatorium perfoliatum, L., forma PURPUREUM. Flowers purple. Budd's Lake, Dr. Porter.

Liatris spicata, (L.), Willd., forma ALBIFLORA. An albino found by Rev. Mr. Lighthipe near Bay Head.

Solidaga odora, Ait., forma INODORA (Gray). (*S. odora*, var. *inodora*, Gray. Man. 244). Quaker Bridge, Leggett.

Cnicus altissimus, (L.), Willd., var. *discolor*, (Muhl.), Gray, forma ALBIFLORA. An albino from Carlstadt, Rev. R. E. Schuh. Found also on Long Island and Staten Island.

Lobelia syphilitica, L., forma ALBIFLORA. An albino of occasional occurrence.

Gaylussacia resinosa, (Ait.), T. and G., forma LEUCOCARPA (Porter). (*G. resinosa*, var. *leucocarpa*, Porter, Bull. Torr. Club, xvi. 21). In my view better referable to this rank.

Sabbatia stellaris, Pursh., forma ALBIFLORA. Flowers white. Not uncommon.

Gentiana Andrewsii, Griseb., forma ALBIFLORA. An albino, found at Tenafly by Dr. Milton Turnure, and known also from Pennsylvania.

Phlox subulata, L., forma ALBIFLORA. Flowers white. Lambertville, A. C. Apgar.

Gerardia purpurea, L., forma ALBIFLORA. Flowers white. An albino of occasional occurrence.

Gerardia tenuifolia, Vahl, forma ALBIFLORA. Flowers white. An albino found by Mr. Leggett at South Amboy, and by Mr. Schuh at Rosemont.

Brunella vulgaris, L., forma ALBIFLORA, (Bogenhard). (*B. vulgaris*, var. *albiflora*, Bogenhard, Fl. Jena. 315). Flowers white. Found by Mr. Lighthipe at Woodbridge.

Calopogon tuberosus, (L.), B. S. P., forma ALBIFLORUS. Flowers white. May's Landing, Dr. Peters.

Sisyrinchium angustifolium, Mill., forma ALBIFLORUM (Raf.) (*S. albiflorum*, Raf.) Found at Point Pleasant by Prof. E. H. Day, and at Freehold by Dr. Lockwood.

Lilium Canadense, L., forma RUBRUM. Flowers red. Near West Milford, Passaic Co., Britton, and reported from Bergen Co. by Mr. Woolson.

Tradescantia Virginica, L., forma ALBIFLORA. Flowers white. Found by Dr. Porter at Holland, Hunterdon Co.

Sagittaria sagittæfolia, L., forma OBTUSA (Willd.), (*S. obtusa*, (Willd.); forma LATIFOLIA (Willd.), (*S. latifolia*, Willd.); forma HASTATA (Pursh); (*S. hastata*, Pursh), forma ANGUSTIFOLIA (Engelm.), (*S. variabilis*, var. *angustifolia*, Engelm.); forma GRACILIS (Pursh), (*S. gracilis*, Pursh.)

I am of the opinion that the reference of this species known in the Manuals as *S. variabilis*, Engelm., to the Old World *S. sagittæfolia*, as Micheli has it in DeCandolle's Monographs, Vol. iii. 66, is the most satisfactory disposition of it, and that the varieties named by Dr. Engelmann in the fifth edition of Gray's Manual are better regarded as forms.

N. L. BRITTON.

On Buxbaumia indusiata, Bridel.

In a small collection of mosses lately sent from the new State of Washington by Mr. Charles V. Piper, there were a few small specimens of *Buxbaumia*, which were found growing on wet logs at Seattle in June, 1889. The plants were still attached to bits of the log, and were surrounded with *Tetraphis pellucida*, a *Hypnum* and five species of Hepaticæ.[*] The wood of the log is reddish-brown in color, and is plainly coniferous; it may be *Thuya gigantea*. The plants of *Buxbaumia* are rather over-mature, and have lost their opercula, and the outer peristome is pretty much gone also. The capsules are irregular in shape, but on the average more ovate-cylindrical than those of *B. aphylla*, and are paler in color. Recognizing them as probably *Buxbaumia indusiata*, it became desirable to prove them to be this species, the existence of which in the western hemisphere had never to my knowledge been announced or even suspected.

I could not obtain a satisfactory peristome, and though the habitat, on wet decaying logs, the shape of the capsules and the color were all that one should look for in *B. indusiata*, something more was wanting. Noticing that Schimper says that the spores of *B. indusiata* are thrice the diameter of those of *B. aphylla*, I compared the spores of the Washington plant with those of *B. aphylla* from Connecticut, and found them about two and a half times larger, and all doubt of the reality of Mr. Piper's most interesting discovery vanished.

Mrs. Britton, on learning of this discovery, most kindly shared with me a few plants of a *Buxbaumia* collected March 23, 1889, by Mr. J. B. Leiberg on decaying logs in Kootenai County, Idaho, and these also proved to be *B. indusiata*, one or two of them showing the characteristic conical operculum, and the spores also being large. The same lady then sent me for examination all the *Buxbaumias* in the Columbia College Herbarium, and among them, to my delight, I found three plants of unmistakable *B. indusiata* collected in October, 1869, by Professor C. H. Peck, "on rotten logs in a swamp, Catskill Mts." These plants have the conical opercula in perfect condition, but the spores are not quite mature, and run a little smaller than in the Washington specimens. Professor Peck writes me that the station must be "in the immediate vicinity of Haines' Falls, probably in the swampy lowland between Haines' Falls and Tannersville." Examination of the spores of both species, both American and European, shows some variation in size; but the average diameter of the spores of *B. indusiata* is from twice to twice and a half that of those of *B. aphylla.*

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[*] Prof. Underwood has kindly identified these Hepaticæ; *Aneura palmata* is the most abundant species; the others are *Cephalozia multiflora*, *C. bicuspidata*, *Jungermannia incisa* and *Blepharostoma trichophyllum*. The *Hypnum* is apparently a young plant of *Plagiothecium undulatum*.

It may perhaps be questioned whether the moss collected by Lyall in the Cascade Mountains, and referred to *B. aphylla* in the Flora of California, be not the rarer species; but the specimens are not now in America. Leaving them out, I find no evidence that *B. aphylla* has been found west of Ohio. The most evident differences between the two species may be set side by side in the following manner:

B. aphylla.	*B. indusiata.*
Capsule shining, reddish, obliquely ovate, much flattened on the upper side, the external cuticle firm and persistent.	Capsule dull, pale, sub-erect, ovate-oblong, more tapering, but slightly flattened, the external cuticle at length ruptured along the flattish side and revolute.
Operculum thimble-shaped.	Operculum conical.
Outer peristome simple.	Outer peristome triple or quadruple.
Spores small (5-8μ).	Spores about twice or twice and a half the size of those of *B. aphylla* (10-16μ).
Habitat; on earth.	Habitat; on decayed logs.

Now that *B. indusiata* is known to be American as well as European, all moss lovers will be on the lookout for it, and I doubt not that it will be found on decaying coniferous logs all the way from New England to the Pacific. I will gladly receive and examine any specimens that may be sent me.

New Haven, March 22, 1890. DANIEL C. EATON.

Index to Recent American Botanical Literature.

Abutilon vexillarium. W. W. (Garden, xxxvii. 274, 275, plate 745).

Anemone Hepatica.—Dates of Flowering of. Arthur Hollick. (Proc. Nat. Sci. Assn. of S. I., March 13, 1890).

The earliest recorded dates of blossoming for this species on Staten Island, are tabulated for the past twenty years, from which it appears that February 16th, of the present year, is by far the earliest during the entire period.

Aster ptarmicoides. (Garden & Forest, iii. 152, fig. 27).

Arrangement of Genera in the National Herbarium.—The System of. F. V. Coville. (Bot. Gaz. xv. 68, 69).

Boldo. H. H. Rusby. (Reprint from Drug. Bull., March, 1890, illustrated).

Under this caption is an account and picture of *Peumus boldus*, Molina.

Botanical Study.—Methods of. W. J. Beal. (Garden & Forest, iii. 174, 175).

Campanula rotundifolia. (Garden, xxxvii. 225, illustrated).

Cardon Forest.—A. T. S. Brandagee. (Zoe, i. 26).

" Cardon " is the popular name by which the Mexicans designate *Cereus Pringlei* and *C. pecten-aboriginum.*

Crossosoma. Frank H. Vaslit. (Zoe, i. 27).

In this article the statement is made that: "it is doubtful whether the second species, *C. Bigelovii* is anything more than a depauperate variety of the first," (*C. Californicum*).

Cypress of Montezuma.—The. (Garden & Forest, iii. 150, fig. 28).

An account of a famous tree of *Taxodium distichum*, growing near the city of Mexico. Its height is about 170 feet, and girth about 50 feet. Its age is computed at about 700 years. Many gigantic individuals of this species are known throughout Mexico and Central America, where they grow in comparatively dry ground, and without the " knees " which are such prominent features in the more northern swamps. The figure represents the base of the trunk.

Cypress.—The Deciduous. (Gard. Chron. vii. 324, figs. 49 and 50, and Plate).

From this account and picture we may understand how the "knees" appear when the tree is grown in England. The article includes a general review of the recent discussion of "knees" by American botanists.

Ergot in 1889.—*Prevalence of.* Erwin F. Smith. (Journ. Mycol. v. 202-204).

Erysipheæ of Montana.—A Preliminary List of the. F. W. Anderson. (Journ. Mycol. v. 188-194).

A list of twelve species, with their host plants.

Erysipheæ upon Phytoptus Distortions. F. W. Anderson and F. D. Kelsey. (Journ. Mycol. v. 209, 210).

Eupatorium probum. N. E. Brown. (Gard. Chron. vii. 321, fig. 48).

This species is here described as new, with the information that it has been known in cultivation for twenty years, having been introduced from Peru about 1870, and yet has remained undescribed until the present time.

Flora of the Santa Barbara Islands.—On Certain Peculiarities in the. J. W. Fewkes. (Am. Nat. xxiv. 216-224).

The present flora of the Santa Barbara Islands is believed by the author to most nearly resemble the former flora of the adjacent mainland, prior to the time when this latter was modified by recent climatic changes. It is supposed that many species suffered almost or complete extinction in the struggle for existence with the plants driven southward by the cold of the ice age, and westward by the gradual desiccation of the arid regions, whereas the island flora would be exempt from these influences. The significant fact is noted that many plants which are only represented by a meagre number on the mainland, are abundant on the islands, and the genus *Lavatera* is said to be represented by four species on the island of Santa Cruz, while there is not another species known on the American continent. Similar facts in the zoölogy of the islands are also noted. Where isolated colonies of the insular flora have been found on the mainland, they may be supposed either to be the last remnants of the original stock, or possibly a recent incipient colonization from the Islands.

Fungi.—North American. Part III. A. P. Morgan. (Journ. Cin. Soc. Nat. Hist. xii. 163-172, Pl. XVI. Reprinted).

Tylostoma verrucosum and *T. campestre* are described as new and figured. Figures are also given of *Tylostoma mammosum*, *T. fimbriatum*, *T. Meyenianum*, *Clavatia craniformis* and *C. elata.*

Fungous Diseases of the Onion (*Allium Cepa*).—*On Certain*. Roland Thaxter. (Ann. Rep. Conn. Agric. Exp. Sta. for 1889, report of the Mycologist).

The following are figured: *Urocystis Cepulæ*, *U. Colchici*, *U. magica*, *U. Anemones*, *U. occulta*, *U. Hypoxys*, (n.sp.), *Ustilago Maydis*, *U. segetum*, *Phytophthora Phaseoli*, *Macrosporium sarcinula*, var. *parasiticum*, *M. Porri*, and *Vermicularia circinans.*

Hemlock.—The. A. N. Prentiss. (Garden and Forest, iii. 157, 158, fig. 29).

Heuchera from Montana.—An Undescribed. D. C. Eaton. (Bot. Gaz. xv. 62).

Heuchera Williamsii is described as new, collected by Mr. Robt. S. Williams in and near the Belt Mountains, Montana.

Jamaica.—Bulletin No. 16 *of the Botanical Department.* (Govt. Printing Est., Jamaica, Nov. 1889).

Lælia glauca. (Gard. Chron. vii. 356, fig. 52).

Liability of Trees to Disease.—The Comparative. J. G. Jack. (Garden & Forest, iii. 176-178).

Under the heading of "disease" are included all causes of injury to vitality of the tree, such as insects, fungi, etc. A list of trees is given, with the pests by which they are afflicted.

Licheni Patagonici Raccolti Nel 1882 *Dalla Nave Italiano Caracciolo.* A. Jatta. (Giorn. Bot. Ital. xxii. 48-51).

Licheni Raccolti Nello Scioa Dal Marchese Antinori. A. Jatta. (Giorn. Bot. Ital. xxii. 51, 52).

Lily Disease in Bermuda. A. L. Kean. (Annals of Botany, iv. 169, 170).

List of Plants Collected on the Rupert and Moose Rivers, along the shores of James Bay and on the Islands in James Bay, during the summers of 1885 *and* 1887. J. M. Macoun. (Ann. Rep. Geol. Surv. Canada. iii. 63j-74j, 1889).

List of Plants Collected by Dr. G. M. Dawson in the Yukon District and Adjacent Northern Portion of British Columbia, in 1887. J. Macoun. (Ann. Rep. Geol. Surv. Canada, iii. 215b-228b, 1889).

Manual.—The New. William Trelease. (Bot. Gaz. xv. 71-74).

There was naturally considerable interest expressed as to the review of this work, which would probably appear in the Gazette. The reviewer's estimate of the work in general is so entirely in accord with that of all who have examined it, that we cannot do better than quote from his words: "As a book it is every bit as good as the last edition. * * * As a manual for convenient use, it is considerably better." When, however, the attempt is made to explain the shortcomings in nomenclature, it becomes a case of "*qui s'excuse s'accuse.*" We shall take the space to make a somewhat liberal quotation. "Had the new edition of the Manual appeared after a lapse of time since Professor Gray's death, it would undoubtedly have shown a greater number of unfamiliar names than is now the case; but it is gratifying to find that in an edition planned by him, a conscientious effort has been made to conform as far as possible to his views regarding the limitation and nomenclature of species. * * * The editors will doubtless be criticised for this feature of their work, since there is now an unmistakable disposition to fix the earliest used specific name as that of the species, under whatever genus this may have been placed, a tendency which in some quarters reaches for both generic and specific names back of the Linnæan introduction of binomials. * * * Although the tendency referred to repudiates in several important respects the code adopted by the Congress of 1867, which was framed by botanists quite as wise in their day and generation as any who now pass judgment on their views, it cannot be denied that a rigid application of the principle of priority can scarcely lead to any other result; and it may be that with the concurrence of the next generation the temporary instability of the nomenclature will finally give the real stability that all botanists desire. * * * In this connection, however, attention ought to be called to the unadopted changes in generic names in the *Nymphæaceæ* that have recently been discussed in the BULLETIN OF THE TORREY BOTANICAL CLUB, and to the unaccepted substitution of *Hicoria* for the familiar *Carya.* However it may be with these genera, it is to be regretted that *Spergularia* of the old edition appears in this edition as *Buda* and not *Tissa.*"

Manual.—The New. C. E. Bessey. (Am. Nat. xxiv. 278, 279).

Professor Bessey, in a quiet way, voices the disappointment of all progressive botanists, that the Manual should have failed to commend itself to any except those who are wedded to old and rapidly decaying ideas. He says: "The time-honored arrangement of orders, time-honored genera, the time-honored rules as to capitalization, punctuation and citation of authorities, are strictly adhered to. The gymnosperms are still wedged in between monocotyledons and dicotyledons; *Carya* is *Carya* still. * * * *Nymphæa* is *Nymphæa* still. * * * We had hoped for something different. Meanwhile we are glad to get the book, for it was much needed."

Manual of the Botany of the Northern United States. T. S. B. (Zoe, i. 30).

In this review of the new edition of Gray's Manual, the reviewer says: "Very few names are changed, a matter of congratulation in the present unsettled state of botanical nomenclature. It will be quite time enough to make these changes in text books and manuals when some degree of permanency shall have been reached." We fail to see how permanency can ever be reached, so long as compilers of text books and manuals are content to use any names that may suit their fancy. There is evidently not a consensus of opinion between T. S. B. and the writer on page 1 of the same publication.

Massangea hieroglyphica. (Garden, xxxvii. 244, illustrated).

Mousses Nouvelles de L'Amerique du Nord. F. Renauld et J. Cardot. (Bull. Soc. Roy. Bot. xxviii. 125-134, tt. vii-ix).

This is a translation of the description and a reprint of the plates already published in the *Botanical Gazette* for April, 1889, with the exception of a few additional remarks under *Dicranum Howellii.*

Mycological Notes. Geo. Massee. (Journ. Mycol. v. 184-187, pl. xiv.)

Stella Americana is described as a new genus and species, from Lower Carolina.

Necessity for a Redescription of the Type Species in Kew Herbarium. B. T. Galloway. (Journ. Mycol. v. 215, 216).

The author says: "There are over seven thousand type specimens of fungi in the Kew Herbarium, but every mycologist knows that in the majority of cases the descriptions of these are so meagre, and the figures so inaccurate, that it is absolutely impossible to use them in the determination of species."

Nomenclature of Organic Life.—The. H. W. Harkness. (Zoe, i. 1-4).

Old time conservatism will find but little comfort in this article, as: "The rigid enforcement of the law of priority seems to give the best promise of a stable nomenclature—a boon so precious that even a very considerable preliminary confusion may well be endured in the prospect of attaining it. To be in any degree effectual, it should be enforced without any of those exceptions upon which systematists soonest and most completely split." The author would retain the most incongruous specific name, or a barbarous combination of names, rather than infringe upon this law. In regard to the citation of authorities, a method of escape is suggested in the citation "of the place of publication or page of an index, to which sooner or later all such matters are likely to be relegated." We should like this suggestion to be made a little clearer, and, in view of the fact that the subject is attracting a great deal of attention and interest at the present time, would make bold to ask that an example be given of just what is intended—for instance, we fail to grasp exactly how page 20 of Zoe would appear if the above suggestion were applied to it.

Notes on Some Western Plants. J. N. Rose. (Bot. Gaz. xv. 63-66, pl. X).

Pentstemon Tweedyi, *Erigeron Parryi*, *E. Tweedyana*, and *Chorizanthe Vazeyi* are described as new, the latter figured.

Onion Disease in Bermuda. A. L. Kean. (Annals of Botany, iv. 170, 171).

The question whether *Macrosporium parasiticum* or *Peronospora Schleideniana* is the cause of the disease does not yet seem to be settled.

Panicum virgatum. F. H. (Garden, xxxvii. 245, illustrated).

Parry.—Dr. Chas. C. (Bot. Gaz. xv. 66-68).

Perenospora Cubensis, B. & C.—New Localities for. B. T. Galloway. (Journ. Mycol. v. 216).

Specimens have lately been received from Anona, Fla., and College Station, Tex.

Penicillium and Corrosive Sublimate. J. M. Coulter. (Bot. Gaz. xv. 69, 70).

The fact is here noted that a rank growth of *Penicillium glaucum* was found growing upon a mass of flour paste strongly impregnated with corrosive sublimate.

Peronosporeæ for 1889 *in New Jersey.—Some Notes Upon Economic.* Byron D. Halsted. (Journ. Mycol. v. 201-203).

Notes are given upon *Peronospora Cubensis*, *Phytophthora infestans*, *P. viticola*, *P. Violæ*, and *Cystopus Ipomææ-panduratæ.*

Platanus.—The Palæontologic History of the Genus. L. F. Ward. (Reprinted from Proc. U. S. Nat. Mus. xi. plates XVII-XXII, 1888).

The close relationship existing between the many fossil species of plants which have been named from time to time under the genera *Platanus*, *Aralia*, *Araliopsis*, *Sassafras*, etc., is here pointed out, and the significance of the peculiar basal appendages to the leaves is emphasized. In the older representatives of the genus *Platanus* these were very pronounced, and their aborted remains are yet to be seen, especially in connection with leaves upon young shoots and trees of *Platanus occidentalis.* The plates are admirably designed to illustrate the argument of the text, and contain representations of *Aralia notata*, Lx., *A. digitata*, Ward, *Aspidophyllum trilobatum*, Lx., *A. dentatum*, Lx., *Platanus basilobata*, Ward, *P. appendiculata*, Lx., *P. occidentalis*, L., *Sassafras officinale*, Nees and *S. Cretaceum*, Newb.

Pinus Jeffreyi. W. Coleman and J. B. Webster. (Garden, xxxvii. 280).

An account of its introduction and growth in Great Britain, and hints for its proper cultivation.

Prestœa Carderi. (Bot. Mag. Tab. 7108).

Piperaceæ Costaricences Novæ. (Comp. Rend. Séance, Soc. Roy. Bot. Belg., Année 1890, 69-71).

Piper Pittieri, *P. pulchrum*, C. DC., var. *Costaricense*, *Peperomia Tonduzii*, *P. chrysocarpa*, *P. barbana* and *P. palmana* are described as new by M. C. DeCandolle.

Pyrenomycetes.—Contributions to the History of the Development *of the.* Franz von Tavel. (Journ. Mycol. v. 181-184) pl. XIII, continued).

Cucurbitaria Platani is described as new.

Root Fungus of New Zealand. R. A. Wright. (Journ. Mycol. v. 199, 200).

The author questions the statement of Professor Kirk, that it is *Lycoperdon gemmatum*, but does not determine the species himself.

Rust of Flax. B. T. Galloway. (Journ. Mycol. v. 215).

This fungus (*Melampsora lini*) which is found upon our native *Linums* and has occasioned considerable trouble abroad in the cultivated flax fields, does not seem as yet to have attacked the crops in this country.

Shortia galacifolia. (Garden, xxxvii. 290). A short note to the effect that the plant is now in flower at Kew, "and, judging from its health and vigor, is likely to become popular."

Slover Mountain.—The Botany of. S. B. Parish. (Bot. Gaz. xv. 51-53).

Sorghum Blight.—Status of the. W. A. Kellerman and W. T. Swingle. (Journ. Mycol. v. 195-199).

The question of priority in publication of investigations concerning this organism is discussed and citations quoted.

Sports. M. T. Masters. (Garden & Forest, iii. 162-164).

In this article the author gives us the latest facts in regard to hybridization, influence of stock on scion and *vice versa*, sex variation, cell life, etc., and their influence in the production of sports in the vegetable world.

Tillandsia usneoides. (Garden, xxxvii. 221, illustrated).

Uroglœna Volvox, Ehr. S. W. Williston. (Microscope, x. 81, 82).

Willows.—Notes on North American. V. M. S. Bebb. (Bot. Gaz. xv. 53-56).

In this contribution the author gives us interesting and critical notes upon *Salia Hookeriana*, *S. myrtillifolia*, *S. arbusculoides* and *S. subcordata*.

Woods.—Microscope Study of. Henry L. Tolman. (Am. Month. Mic. Journ. xi. 49-56, figs. 1-9).

Sections of *Pinus Lambertiana*, *P. ponderosa*, *P. australis*, *P. Strobus*, *Taxodium distichum*, *Abies Douglasii*, *Sequoia sempervirens*, *Rhus toxicodendron* and *Juglans nigra* are figured.

Proceedings of the Club.

The regular meeting was held Tuesday, April 8th, at Columbia College, the President in the chair and 23 persons present.

Mr. R. W. Gardner was elected an active member.

The death of Dr. Geo. Thurber, an ex-President of the Club, was announced.

Dr. Britton showed *Ranunculus hederaceus* collected by Rev. Arthur Waghorne in Newfoundland, this being a new station for the plant, hitherto known as North American only from Virginia.

Dr. Rusby spoke of the desirability of the Club directing some instructive work in Botany. The matter was referred to a committee of five. "The Characeæ," by T. F. Allen, M.D., the lecture announced for the evening, then followed.

The second April meeting was held on Wednesday evening, at Columbia College, the President in the chair and 32 persons present.

Mrs. Gen. Lewis Fitzgerald, Mr. Henry Kraemer and Mrs. J. L. Lewis were elected active members.

The Chairman of the Committee on Instruction reported favorably and recommended that a permanent Committee on Instruction be appointed; that the present season's course consist of ten afternoon Lectures given at the College of Pharmacy, alternating with ten Saturday excursions, the whole course to terminate about July 1st, and that the fee for each member of the class shall be five dollars. The President appointed on such committee, H. H. Rusby, J. S. Newberry, Emily L. Gregory, Wm. E. Wheelock, Elizabeth G. Britton, Henry Kraemer and Arthur Hollick.

The Committee on Botanic Garden reported progress and on motion was enlarged to eleven members.

Prof. Porter delivered the lecture of the evening, entitled "A Memoir of Linnæus."

REPORT OF FIELD COMMITTEE FOR THE YEAR 1889.

In presenting this report I am obliged to announce the great difficulties which your committee has experienced on account of the excessively stormy season. Many of our meetings have been entirely prevented, or the attendance reduced to its lowest terms. Some of our most successful meetings have been held in the face of the storm.

The first field meeting of the season was at South Amboy, New Jersey. But few plants were collected, the important ones being *Epigæa repens* and *Pyxidanthera.*

The next meeting of April 27th to Richmond Hill, Long Island, was entirely prevented by the storm.

On May 4th the Club met at Van Courtlandt, New York, upon which occasion 40 species were collected, the most interesting being *Ranunculus fascicularis*, *Silene Pennsylvanica*, *Trillium cernuum*, *Diclytra Cucullaria.*

Upon the 11th of May we met at Bronx Park, New York, Miss E. Cannon appointed as guide. This meeting was of special interest, as it enabled the members to survey the site which has been deemed most appropriate for the New York Botanical Garden. Miss Timmerman reports 65 plants as collected this day, the most interesting being a *Ranunculus* doubtfully referred to *R. Pennsylvanicus*, *R. septentrionalis*, *Corydalis sempervirens*, *Viola pedata*, *Staphylea trifolia*, *Myrica cerifera.*

On May 18th, under the guidance of Miss L. M. Stabler, we visited Pelham Manor, New York, and collected 47 species, among them *Arabis lyrata*, *Saxifraga Pennsylvanica*, *Rhododendron viscosum*, *Aphyllon uniflorum* and *Trientalis Americana.*

On May 25th Mrs. Britton conducted the party to Prince's Bay, Staten Island, the meeting being one of unusual interest, 49 plants being recorded. Among those more especially worthy of mention were *Viola primulæfolia*, *Oxalis violacea*, *Leucothoe racemosa*, *Melampyrum lineare*, *Veronica Chamædrys*, *Ornithogalum umbellatum* and *Isoetes Engelmanni.*

On May 30th, Decoration Day, your speaker was appointed to conduct the Club to Montclair Heights, a most interesting locality. The morning proved stormy, and on arriving at the railway station I found but a single member, Mr. Martens, prepared to accompany me. We attended the locality and my friend was rewarded by finding a single specimen of the rare *Obolaria Virginica* and two or three pretty specimens of *Liparis.*

The next meeting of June 1st, to Soho, New Jersey, was entirely prevented by the storm.

Upon June 7th, 8th and 9th the most important meeting of the season was held at Naomi Pines, a small settlement some four miles distant from Pocono Summit, Pennsylvania. This excursion might well be made the subject of a special paper, not only because of the pleasure afforded to the visitors, but because of the importance of the discoveries made. The Philadelphia Academy of Sciences had been invited to join us, and had sent quite a large delegation. Visitors were also present from Easton, Pennsylvania, and other points. The meeting was conducted by Prof. Thomas C. Porter, who was well acquainted with the locality. Great energy was exhibited by the explorers, and the entire three days comprised a continuous round of the most happy experiences, both scientific and social. I do not remember to have heard a single member of the party express the opinion that they had ever enjoyed a similar event more. 141 species are recorded as having been collected. Perhaps no other collection exceeded in interest that of the *Caltha flabellifolia*. This species, originally collected by Pursh, has been omitted from our manuals on the ground of doubts as to its genuineness. Prof. Porter's rediscovery of it at this point leaves no doubt as to the fact. It grows in spring water, has very small flowers and is markedly different from any other United States form. *Coptis trifolia* was abundant in fruit, and presented a fine appearence. In a field was found a large patch of *Aquilegia vulgaris* which had escaped from cultivation and had reached a perfection of beauty which none of us had ever seen presented by the cultivated plant. Those members who were not accustomed to a northern or white pine flora, were greatly interested in seeing *Viola rotundifolia*, *Oxalis Acetosella*, *Nemopanthes mucronata*, *Rubus Dalibarda*, *R. strigosus*, *Pyrus Americana*, *Ribes prostratum*, *Aralia hispida*, *Viburnum lantanoides*, *Lonicera cœrulea*, *Diervilla trifida*, *Chiogenes hispidula*, *Ledum latifolium*, *Polygonum cilinode*, *Myrica Gale*, *Trillium erythrocarpum*. Especially noticeable for their beauty were the *Cornus Canadensis*, which grew in great snowy white beds in open places among the pines, both the *Kalmia angustifolia* and *K. latifolia*, *Cypripedium acaule*, *Clintonia borealis*, though this was a little past its prime, and the *Sisyrinchium angustifolium*. The latter made the meadows blue, and elicited expressions of admiration from every one. Its flowers exceeded in size anything that we had ever seen, and rivalled those of the beautiful *S. Arizonicum.* A white-flowered form was several times collected. But most gorgeous of all the plants found was the brilliant *Rhododendron canescens.* The woods, both deep and open, were ablaze with it in every direction, and the air laden with its delicious fragrance. This plant has the color of the *R. nudiflorum*, but much richer and deeper. It is unquestionably distinct, and was of special interest, as its genuineness as a species has long been seriously questioned. *R. Canadense*, and *R. maximum* were also found. Three species of *Ilex*, namely: *lævigata*, *monticolor* and *dubia*, *Prunus Pennsylvanica*, *Drosera rotundifolia*, *Callitriche heterophylla* and *C. verna*, *Oxycoccus macrocarpus* and *O. palustris* were also collected with interest. Among orchids we were pleased to find *Corallorhiza multiflora* and *Goodyera repens*, the latter in bud. Eleven species of *Carex* were noticed among them the *folliculata*, *trisperma*, *echinata*, and *varia.* Among grasses we were pleased to obtain the *Oryzopsis juncea* and *Aira flexuosa.* Five species of *Lycopodium*, namely: the *annotinum*, *clavatum*, *complanatum*, *lucidulum* and *obscurum*, were collected.

Lastly, and perhaps ranking third in order of importance among all our collections, was the discovery by Mrs. Britton of the most rare *Botrychium simplex.* Other interesting ferns were collected, but my list is already too long.

After the return of the rest of the party, Dr. and Mrs. Britton, Miss Timmerman and Dr. Schœney remained at the Deleware Water Gap for a day or two and were rewarded by some most interesting discoveries. They added 33 to the number of species collected. Among the more interesting of them were *Prunus pumila*, *Rosa humilis*, *Rubus odoratus*, *Comandra umbellata*, both species of *Woodsia*, *Rosa rubiginosa*, *Rhus typhina*, *Veronica Anagallis* and, exceeding all others in importance, the rare fern, *Asplenium montanum.* In concluding my report upon this most important meeting, I can only express the hope that when a similar excursion is arranged during the coming year it will be much more highly appreciated, and largely attended by those members absent on this occasion.

On June 15th a meeting was held in the neighborhood of Grassmere, Staten Island, at which 63 species were collected, among them *Oxalis violacea*, *Trifolium hybridum*, *Lonicera sempervirens*, *Galinsoga parviflora*, *Calopogon tuberosus*, with the *Pogonia* which almost always accompanies it, *Aletris farinosa*, *Lilium erectum*, *Tilia Americana* and *Peltandra Virginica*.

On June 22nd a very interesting meeting was held at Crugers, New York, and 56 species collected. Of especial interest was the *Silene inflata*, *Erigeron ramosus*, *Lobelia spicata*, and *Cimicifuga racemosa*.

At Fort Lee on the 29th of June, 90 species were collected. Of special note were *Hesperis matronalis*, *Rhus typhina*, *Trifolium hybridum*, *Sedum acre*, *Convolvulus arvensis*, *Carpinus Caroliniana*, *Lilium Canadense*, *Ruppia maritima*, *Conium maculatum*, *Hieracium venosum* and *Galinsoga parviflora*.

It having been decided by the Club inadvisable to hold meetings during the warm weather, no card was issued until September.

On the 7th of September, by the kind invitation of Mr. E. S. Miller, we were to hold a meeting at Floral Park, Long Island. But the day was so very stormy that but a single member presented himself at the railway station, and he returned. So far as I am informed the meeting of September 14th at Erastina, Staten Island, was postponed for the same reason.

On the 21st of September your speaker was to conduct a meeting at Snake Hill, New Jersey. Business unavoidably detained him, and he has received no report beyond the fact that a good time was enjoyed.

On Sept. 28th Dr. Britton conducted a meeting at Crugers and Verplanck's Point, when 45 species were collected. Most interesting finds were *Solidago squarosa*, *Asters undulatus, patens, multiflorus, Novi-Belgii, diffusus*, *Silene inflata*, *Echium vulgare*, *Helianthus giganteus*, *Lonicera parviflora*, *Gentiana Andrewsii*, *Bouteloua racemosa*, *Phaseolus helvolus*, *Calamintha Clinopodium*, *Viburnum pubescens* and *Arenaria Michauxii*.

Excursions were arranged for Oct. 5th to Van Courtlandt, New York, and on Oct. 12th to Little Ferry, New Jersey. Of neither of these meetings have I received any report. Neither have I received a report on meeting of Nov. 5th at Grassmere, Staten Island.

H. H. RUSBY,
Chairman Field Committee.

NOVEMBER 26, 1889.

BULLETIN
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Remarks on the Group Cinnamomeæ of the North American Roses.

By G. N. Best.

These remarks are based on an examination of the large and valuable collection of the Geological and Natural History Survey of Canada, Prof. John Macoun; the collections of Lafayette College, Prof. T. C. Porter, and of the Philadelphia Academy of Natural Sciences, Mr. J. H. Redfield; contributions from Rev. R. E. Schuh, Minnesota; Mr. Chas. V. Piper, Seattle, Washington; Dr. N. L. Britton, Dr. Sereno Watson, Mr. A. S. Hitchcock, St. Louis, Mo., and Mr. O. A. Farwell, Mich., to all of whom I tender my sincere acknowledgments.

To M. Crépin, the distinguished rhodologist of Brussels, I am likewise under many obligations, not only for rare specimens, illustrative of the species of the Old World, by which I was enabled to compare allied forms of this country, but also for making me acquainted with the results of his very extensive and valuable observations. While the views herein expressed are believed to be largely in accord with those entertained by him, the author, however, is solely responsible for them.

The group Cinnamomeæ, enlarged so as to include the Gymnocarpæ and the Alpinæ, is confessedly a difficult one with which to deal. Scarcely a species but occupies more or less debateable ground. The geographical distributions are far from being accurately known. In this respect the best that can often be done is an approximation. Much time and patient labor are yet required before satisfactory results can be attained. These remarks are therefore to be regarded as strictly preliminary.

The importance of good material is so great that a few suggestions as to collecting, it is hoped, will be pardonable. A small flowering or fruiting branch makes a beautiful specimen, but for systematic study it is often quite useless, in that it fails to furnish some of the more essential characters. Specimens should be collected either in flower or in fully matured fruit—just before the falling of the leaves; the latter is to be preferred. A few of the younger, sterile growths of the season should be included. Since stoutness or depauperateness modifies very markedly the characters, it is desirable to collect from both. When possible, the whole bush should be pressed, dividing it in sections if necessary. At all events, enough of the stem should be secured to show the normal arrangement of the spines; this not infrequently varies in different parts of the bush.

Few plants are more strikingly modified by differences in environment than roses. Even the younger growths appear quite different from the older, so much so indeed as to cause them to be taken for different species. A knowledge, therefore, of the value of characters is desirable. Quite contrary to what was once thought, the varying degrees of pubescence, glaucousness, glandulosity, and, to some extent, of prickles, possess little diagnostic value; and are to be considered most frequently as accidents of growth depending on peculiarities of soil and location for their development. Not that they are wholly devoid of value, but are so only when taken in connection with characters of the first order.

The larger prickles, commonly but erroneously called spines, furnish important indications, not so much by their shape and size, as by their arrangement on the stem and branches. Valuable as this character is, there is no other that taxes more the experience and judgment of the rhodologist. In rank bushes the spines may be stout and curved; in depauperate slender and straight, yet belong to the same species. They are frequently absent from bushes to which they normally belong, and this from no known cause. The friction of high water often removes them from such as grow on the banks of streams or low places subject to inundations. It is not rare to find geminate spines grading to single ones on flowering branches, thus appearing and in fact being alternate. On stems normally devoid of spines, it is not uncommon to see two or more of the prickles about the nodes somewhat enlarged. This condition leads to the error of taking them for true geminate spines, which they are not. A little patient study, however, usually suffices to clear up the difficulty in distinguishing the normal type

The behaviour of the sepals during anthesis and the maturing of the fruit, likewise furnish valuable indications, but not so much as do their adnation. They may be persistent on the fruit when fully matured; they may be deciduous by a clear circumcision at their base, or through the apex of the fruit. It is sometimes difficult, not to say impossible, to distinguish the mode of adnation in immature fruit. Sepals are either entire or lobed; when the outer are but slightly lobed, it should be regarded as simply a passing variation from the entire form.

Beyond the mere fact that the styles may be free or connate, little of practical importance has accrued from a very careful study of them. While quite variable, the leaflets vary around a type which is quite constant in the same species. In the more glandular forms, the toothing may be compound-glandular or serrulate, while in those less resinous it may be nearly or quite simple. The stipules, modified leaflets, are characters of varying import. In some groups and in some species they possess diagnostic value; in others they have little significance. It is by their general shape rather than by their width they merit attention. In drying they may become involute, revolute or remain plane. Taking them all in all, they do not possess the value usually allowed them.

The petals, the habit of the bush, its in-ground ramifications, the shape, size and color of the fruit, the number, shape and size of the seed, although usually of secondary importance, yet frequently furnish valuable indications. The insertion of the ovules, as recently pointed out by M. Crépin, is worthy of more than a passing notice. This may be either strictly basil or basilo-parietal. In the Cinnamomeæ it is the latter; in the Carolinæ it is basil. It is needless to say that in roses as in other plants, it is more by the *tout ensemble* than by any single character that a correct knowledge of its position is to be attained.

CLASSIFICATION.

ROSA, Tourn.

GROUP CINNAMOMEÆ,* CREPIN.

Styles free, included ; insertion of the ovules basilo-parietal ; sepals usually erect and persistent on the matured fruit ; inflorescence unifloral or multifloral, with a dilated bract on the primary pedicels ; spines straight or curved, geminate or alternate, usually mingled with setaceous prickles, rarely unarmed ; stem erect or ascending ; stipules adnate to the common petiole ; leaflets 5 to 9 on flowering branches.

Sub-Group GYMNOCARPÆ : sepals early deciduous with the apex of the fruit ; stems more or less prickly.

1. *Rosa gymnocarpa.*

Sub-Group ALPINÆ : sepals erect and persistent on matured fruit ; stems either smooth or armed with scattered prickles, rarely with geminate spines.

2. *Rosa blanda.*
3. *Rosa blanda*, var. *Arkansana.*
4. *Rosa acicularis.*

Sub-Group EUCINNAMOMEÆ : sepals erect and persistent on matured fruit : stems armed with geminate, rarely alternate spines ; more or less prickly.

5. *Rosa Nutkana.*
6. *Rosa pisocarpa.*
7. *Rosa Californica.*
8. *? Rosa spithamæa.*

1. *Rosa gymnocarpa*, Nuttall, 1840, ranges from British Columbia to California, and eastward to Idaho and Montana. Its peculiar dehiscence, so far as is known, distinguishes it from all other North American roses. Two Asiatic species, *Rosa Alberti*, Regel (1883), and *Rosa Beggeriana*, Schrenck (1841), are, as I am informed by M. Crépin, the only roses of this sub-group in the Old World. To know the actual relations of these three closely allied species would be extremely interesting.

2. *Rosa blanda*, Aiton 1789 (*? R. Virginiana*, Miller, 1768) ranges from Newfoundland westward through Quebec, Ontario, New York, to Wisconsin and Illinois, where it passes into var. *Arkansana.* The stem of the type is either smooth or sparingly prickly ; the sepals, stipules and leaflets rarely glandular. It is distinguished from the *Carolinæ* by the absence of geminate spines, by its erect, persistent sepals and by the basilo-parietal insertion of its ovules.

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*Journal of the Royal Hort. Soc. Part III. Vol. XI., Oct. 1889,

3. *Rosa blanda*, Ait. var. *Arkansana*, (Porter). Although frequently observed before, it was first described by Dr. Porter as *Rosa Arkansana*[*] from specimens collected on the banks of the Arkansas River by Mr. Brandagee. The original specimen, in flower, is in the herbarium of Lafayette College. Bush apparently low, 1 to 2 feet high; stem, foliage and fruiting receptacles glaucous; flowers corymbose; sepals entire; bracts lanceolate; leaflets 7 to 11, mostly 9, oblong-elliptical to oblanceolate, somewhat cuneate at base; stipules rather broad; stem prickly.

The stipules are as often broad as narrow; the outer sepals are rarely lobed, probably not much more frequently than in *R. blanda*, from which it is distinguished by its habit of growth, its glaucousness, by one or two pairs more of leaflets, its prickly stem and by its being more or less glandular. It would therefore appear that the characters relied upon to differentiate it from the type lack specific distinctness.

Var. *Arkansana* ranges from Texas and New Mexico northward to British America and westward to the Rockies and probably beyond. It undergoes many modifications. On dry prairies it becomes markedly surculose; its rhizomes are transformed into in-ground stems which give off annual shoots like flowering branches. Since these rhizomes have no leaves, the demand for more foliage is met by an extra pair of leaflets on the suckers. In protected locations, as margins of woods and thickets, it attains a height of from three to five feet, with stem either smooth or prickly, and lives for years. It is sometimes found densely resinous. Like *R. blanda*, rudimentary glands on the sepals and stipules and under surfaces of the leaflets are rarely absent. When its flowers are solitary, as sometimes happens, the low prickly forms bear some resemblance to *Rosa acicularis*, from which it is readily distinguished by its glaucous stem and foliage, leaflets more numerous and of another shape.

4. *Rosa acicularis*, Lindley, 1820, ranges through the northern portions of Europe, Asia and North America. In the New World it extends from Alaska south to about 45° latitude; from the Pacific eastward to Michigan and James Bay. Its synonyms appear to be *R. acicularis*, var. *Bourgeauiana*, Crépin; *R. Sayi*,

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[*] Synopsis of the Flora of Colorado, 1874.

Schwein., a resinous form, and *R. Engelmanni*, S. Watson, a form with oblong fruit.

After having carefully examined several European and Asiatic specimens of this species and a large number of American forms, including the original *R. Sayi* in the Phila. Academy, I cannot find any character of recognized value to separate them. The forms of the New World are usually somewhat more resinous but not constantly so, and the fruit probably more inclined to be globose. These variations are far from being uncommon in other species, as a result of differences in environment. To multiply species therefore, because one specimen has a few more hairs or a few less glands than another, or perchance fruit of a slightly different shape, seems uncalled for.

Rosa acicularis is from one to three feet high, more or less prickly, sometimes densely so; prickles rarely enlarged about nodes simulating geminate spines; leaflets 3 to 7, usually 5 to 7, broadly elliptical to oblong-lanceolate, mostly obtuse or slightly cordate at base, flowers solitary; fruit sometimes globose but usually more or less oblong.

5. *Rosa Nutkana*, Presl, 1857, ranges from western Montana, Idaho, Oregon and Washington northward and probably southward. In its densely resinous forms with stout recurved spines and broad stipules, it is not easily confounded with any other species. Forms, however, occur which are nearly or quite destitute of glands, with straight, slender, sometimes ascending spines, frequently absent or reduced to a single one in the upper part of the stem, leaflets larger and simply toothed, and which are difficult to separate from unarmed forms of *R. acicularis.* The fruit of *R. Nutkana*, large, coriaceous, thick-walled and fibrous, with seeds larger than in any other species, serves to distinguish it.

6. *Rosa pisocarpa*, Gray 1882 (? *R. Woodsii*, Lindley 1820). In "*Primitiæ*" p. 432, M. Crépin describes *R. Fendleri* from a specimen collected in New Mexico. This description is based on a stunted growth with straight slender spines, small leaflets and solitary flowers. He is now, however, inclined to regard it as being practically the same as *R. pisocarpa*, in which opinion I fully concur; but Dr. Sereno Watson considers them quite distinct.

Limited space prevents me from entering into details; I shall, therefore, merely state my conclusions.

As in *R. Nutkana*, and in fact, as in all the Eucinnamomeæ, the spines, which are normally more or less curved, may become straight and slender and not infrequently ascending in the upper part of the bush; so in *R. pisocarpa.*

To divide specimens in two sections, one with straight or ascending spines, and the other with stout recurved spines, would indicate little experience in observing the variability of Roses. Moreover this treatment has been tried with *R. Nutkana* and wisely discontinued.

R. pisocarpa, in its varying forms is widely distributed, ranging from New Nexico to British America, possibly as far north as Alaska (Crepin). It affects low wet locations, attaining a height of 10 to 12 ft. in such, but is much reduced when growing in drier, less fertile ground. Fruit is usually small, ordinarily clustered, rarely solitary; seeds small; dull white; stipules short, usually narrow; leaflets rather small, oblong-ovate to-obovate, usually simply toothed; fascicles of adventitious branches are quite common in the upper part of the bush, especially when reclining.

R. Woodsii is closely related to *R. pisocarpa.* In fact many of the specimens found in herbaria and so labelled are of this species; others have a marked resemblance to *R. blanda*, var. *Arkansana.* As before stated, an occasional small lobe to the outer sepals has little diagnostic value. It may be here remarked that when two or more species grow together, especially if on the limits of each, intermediate forms are common, apparently due either to the influence of a common environment or to hybridization, or to both combined.

Rosa Californica, Cham. and Schlecht. 1827 is badly delimited. M. Crépin speaks of it as a "chaos veritable." The material placed in my hands has been so little, and that little so contradictory, that I have not reached any satisfactory conclusions respecting it. I suspect, however, that one or two good species will be found in the débris when it is thoroughly elaborated. It is quite possible that variations of known species may figure largely in this heterogeneous mass.

A flowering specimen in the herbarium of Lafayette College, collected by Prof. Rothrock at Santa Barbara, seems distinct, but whether it is Chamisso's Rose I cannot tell. It is the terminal portion of a bush, probably 3 ft. high, with stout recurved geminate spines (resembling those of *R. Canina*) without prickles; sepals entire; flowers solitary or corymbose, on short, densely pubescent pedicels; stipules pubescent, narrow, with diverging apices; fruiting receptacle ovate; leaflets 5 to 7, elliptical to oblong-obovate, broadly obtuse or truncate at the apex, tapering to the base, glabrate above, villose-pubescent beneath; serrations compound-glandular. This doubtless varies with spines nearly straight, stem taller and prickly, and with leaves, stipules and pedicels with varying degrees of pubescence and glandulosity.

8. Many roses take on a surculose habit, which would appear to be due to unfavorable conditions of growth or to severe cold. As we have seen, var. *Arkansana* is an example, as are also certain forms of *R. humilis* and *R. foliolosa*. *R. Californica* likewise seems so disposed. In Bot. Calif. 2, 444, Dr. Watson describes *R. spithamæa*. Subsequently, however, he regards it as a "dwarf form of the resinous variety." * Specimens of this, collected by Mr. Rattan along the Trinity River, and kindly loaned me by Dr. Watson, seem to warrant his conclusion. It is most probably a surculose form of some rose which grows stouter under more favorable conditions.

The same may be said of specimens collected by Prof. E. L. Greene in Petrified Forest, Sonoma County, and which differ in several respects from those collected by Mr. Rattan. It would seem probable that these are a surculose form of a closely related yet distinct*ive* species. The description here given is based on specimens in fruit, furnished by Drs. Porter and Britton. Stem 6 to 10 inches high, with stout prickles and long straight or slightly recurved geminate spines; leaflets 5, roundish-ovate, petiolulate, broad and markedly inequilateral at base, crenate-serrate, toothing obtuse, apiculate and serrulate; stipules short, broadest below the middle, apices diverging; flowers many in flat-topped corymbs; sepals short, oblong-lanceolate, pointed, erect and persistent on matured fruit; styles gradually enlarged upward, capitate; pedicels short, glandular-pubescent, as also sepals and fruit; fruit small, yellowish-brown, globose, densely clustered, hispid, pulp scanty, minutely tuberculate; seeds few, large, insertion basilo-parietal. This may be a good species or a surculose form of a good species.

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*Proc. of the Am. Acad., Vol. 20, p. 344.

White Mountain Willows—IV.

By M. S. Bebb.

Salyx argyrocarpa×*phylicifolia*, F. & B. nov. hyb. Year old twigs, stout, dark purple and pruinose; leaves much as in *argyrocarpa*, but twice the size, equally glaucous but less silky beneath, strongly rugose-veined, the margin revolute especially near the base and more coarsely undulate-crenate; fertile aments (the staminate plant has not been found) more as in *phylicifolia*, but shorter and more leafy bracted at the base, capsule more silvery-silky, pedicel scarcely longer, style equally produced, stigmas entire, of a beautiful purplish-red, while those of *phylicifolia* are yellow.

Mr. Faxon remarks of the plant as observed growing: "The hybrid is of about the same height as *phylicifolia*, and I have not yet found it except in Tuckerman's Ravine associated with this species and *argyrocarpa*. It is very distinct in habit, and easily distinguished from either at a distance of more than one hundred feet; from *phylicifolia* by its dull glaucous color and more upright branching; from *argyrocarpa* by its being so much taller. It grows in patches like *phylicifolia*, both frequently entirely surrounded by *argyrocarpa*, but I think the latter does not extend to so low a level as the hybrid, and the hybrid not so low as *phylicifolia*. The youngest leaves on the growing tips of the hybrid are of the same color as the older ones, whereas in *phylicifolia* the new shoots have leaves of a reddish or brownish hue. In fine, it seems like a larger *argyrocarpa* with aments of *phylicifolia*."

In looking over some old sheets of *S. phylicifolia* in Dr. Gray's herbarium, I came unexpectedly upon a single specimen of this hybrid—leaves only, very much discolored, very much poisoned and attached to a sheet of that thin, bluish paper which marks the earliest mounts of this herbarium. The label, in the handwriting of Mr. Carey, is very interesting. First comes " *S.*

phylicifolia, L.? Fries! Tuck!" then under this "*S. repens? forma matura glabra*." Who can not imagine the writer's perplexity? The ink recording one determination is not dry before the alternative is written, and then, as if some decision must be reached, with a bold dash (such as only an old fashioned quill pen with a soft nib ever could make) the "*S. repens*," etc., is almost completely obliterated. Then follows "White Mts., 1842, A. Gr.!" Think of it! Not another spot in America has been so frequently explored by botanists as Tuckerman's Ravine, and yet here is a willow, conspicuous enough to be distinguished "at a distance of one hundred feet," collected by Dr. Gray half a century ago, and thenceforth completely neglected until Mr. Faxon entered the field with the purpose of investigating its willows.*

Salix herbacea, L. "This grows in small, rather dense patches, scattered over a large area about the Lake of the Clouds, between Mt. Washington and Mt. Monroe, and is especially abundant on the steep flowery slopes about the upper edge of the Great Gulf, Mt. Washington and on the Great Gulf side of Mt. Clay, usually intermingled with alpine grasses and other alpine plants. Altitude 5,000-5,800 feet above the sea." (Faxon).

It is noticeable that the *S. herbacea* of the White Mountains does not differ in the least from the plants of Greenland and Scandinavia. It occurs in the same form on Mt. Katahdin; on Mt. Albert, Lower Canada; at the sea level on the coast of Labrador; shores west of Davis Strait; Greenland, and on all the islands across the North Atlantic to Northern and Arctic Europe—everywhere the same little *S. herbacea*. Shall we then regard the White Mountain colony, the outermost station for the species in North America, as having, through this fixity of the specific type, survived unchanged since the close of the glacial epoch? Or is it not much more probable that it owes its origin to wind-carried seeds, and that subsequent and frequent dispersals

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*Anderson has written on the sheet "*S. pedicellaris?*" Here then we have the specimen referred to in DC. Prod. 16.2, 234, as indicating the probability of a hybrid between *S. argyrocarpa* and *S. pedicellaris;* but as *S. pedicellaris* does not grow in the alpine region of the White Mountains, such a cross could not occur spontaneously. Why was not the broad hint given by Carey's ticket accepted as a clue to the probable parentage of a supposed hybrid?

from the area of common distribution northward have helped to keep down any modifications which might otherwise have appeared after long continued and perfect isolation under changed conditions? Mr. Walter Deane gives me the following pertinent quotation from a "Notice of Flowering Plants and Ferns collected on both sides of Davis Strait and Baffin's Bay," read by Mr. James Taylor before the Botanical Society of Edinburgh.* "*S. herbacea*, coast to snow line, covers extensive tracts, and that too where most other plants cease to appear, except *Junci* and *Luzulæ*. *In dry fine weather I have often seen its downy seeds wafted in clouds over land and sea.*" These downy seeds might be transported a very great distance by a strong upper-current of wind, and the alpine summit of a high mountain, with its surface constantly moist and dripping from melting snow-drifts, would present all the conditions favorable for their germination. After this, the gaining and maintaining of a permanent foothold would depend upon climatic influences, to which *S. herbacea* seems peculiarly sensitive. It is not found on the Rocky Mountains, where four at least, of the species with which it is associated in Greenland are widely distributed, though in strongly modified forms. It is noticeably present on all the Arctic shores of the North Atlantic, both American and European; and just as noticeably absent from all the shores of the North Pacific, both American and Asiatic. It does not vary to meet varying conditions, but thrives where these are favorable, and does not grow at all where they are unfavorable.

Notes upon Zygodesmus and its New Species.

The genus *Zygodesmus* is something of a puzzle to the student of systematic fungology, and therefore does not lack in interesting points of structure. Of the twenty-seven species enumerated by Saccardo,* sixteen are known to be North American. None of these infest growing tissues, and a large percentage, fully twenty out of the twenty-seven, are found upon dead wood or bark. It is interesting, therefore, to note that a new species was found early last summer near New Brunswick, N. J., upon the flower-bearing stems of *Pyrola rotundifolia*, namely *Zygodes-*

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*Trans. Vol. 7, 1862.

mus Pyrolæ, Ell. and Hals. The color of the hyphæ of this species is a distinct cinnamon, and forms a thick felt-like covering upon the stem, beginning at the surface of the ground and extending up for about two inches. The whole genus may be considered as a chromatic one, for nearly all colors are represented, as the following names of some of the species will indicate: *Z. fuscus*, *Z. atro-ruber*, *Z. violaceo-fuscus*, *Z. rubiginosus*, *Z. ferrugineus*, *Z. olivascens*, *Z. ochraceus*, there being two species of the latter in Saccardo!

Within the past month another species has been found, and this one has all the characteristics of a genuine parasite, which was not so evident in the *Pyrola* species. While inspecting a bed of cultivated violets under glass for the leaf spot fungus (*Cercospora Violæ*, Sacc.), *Botrytis* and other fungi, it was a surprise to find several leaves upon a few plants in a group covered with a chalky white coat, reminding one somewhat of the Erysipheæ, but without the powdery appearance. A microscopic examination of the infested parts of the leaves showed that the characteristic threads of the *Zygodesmus*, easily recognized by the excessive branching and lateral union of adjoining cells in the hyphæ, were all through the tissue of the host, and had caused the affected parts to lose their green color. A thick mat of hyphæ had formed upon the surface, and threads could be traced from this through the breathing pores to the ramifications within. Upon leaves long infested the tissue becomes dry and contracted, and a cream color replaces the almost pure white. That the species is not confined to the violet is demonstrated by finding a few sprays of parsley growing in the vicinity of the attacked violets, afflicted by the same *Zygodesmus* and whitened almost as if sprayed with a lime-wash.

Besides adding a well established parasite to the genus which is generally held as saprophytic, the violet specimens reach another step in the chromatic scale, and naturally the species has been named *Z. albidus*, Ell. & Hals. and will probably be distributed in the Ellis North American Fungi.

BYRON D. HALSTED.

RUTGERS COLLEGE, April 18, 1890.

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*Sylloge Fungorum, Vol. iv. pp. 283–288.

Grasses in the Wrong Genus Cover.

By W. J. Beal.

In the BULLETIN, page 11, 1888, are described some new species of grasses, among them *Poa macrantha*, Vasey, and *Poa argentea*, T. Howell. I believe these belong to the genus *Melica*.

MELICA ARGENTEA (Howell). An erect, loosely-tufted perennial, 15-20 cm. high. Radical leaves numerous, curved, conduplicate, 3-7 cm. long, in cross section oblong, 0.6-0.8 mm. diameter, bulliform cells wanting, apex obtuse, sheaths loose, membranous, ligule 2-3 mm. long, blades of the culm 2, conduplicate, 11-nerved, 1.5 cm. long by 1.3 mm. diameter, ligule acute 3-5 mm. long. Panicle oblong, spike-like, 2-3 cm. long. Spikelets oblong-linear, 6-8 mm. long, 3-5 flowered, joint of rachilla 1.7-2 mm. long. All the glumes brownish shining, with broad scarious margins. Empty glumes subequal, 3-4-5-nerved, obovate, ovate, variously lobed, toothed or entire, 3.5-5 mm. long; floral glume oval or obovate when spread, denticulate, 5-6-7-nerved, minutely scabrid or smooth, 5.5 mm. long, palea lanceolate, about the length of its glume, scabrous on the keels, anthers 3, 2.5 mm. long.

The following, among other things, indicate that this is a species of *Melica*: the soft, smooth or scarious obovate or irregularly toothed glumes, empty glumes often 4-5-nerved, the long spongy joints of the rachilla, the floral glume without hair at the base, often 6-7 nerved, the nerves evanescent, not connivent above.

Plants from T. Howell ticketed *Poa argentea*, Howell, collected in Siskiyou Mountains, Oregon, July 18, 1887; also from U. S. Agr. Dept. ticketed *Poa macrantha*, Vasey, collected on sea coast, Oregon, by Thomas Howell.

MELICA MACRANTHA, (Vasey).—A smooth stout perennial 3–4 dm. high, ascending from creeping rootstocks. Leaves of the culm, excepting 2–3 of the upper ones, bear in their axils non-flowering leafy branches. Leaves of these branches conduplicate, curved and flexuose, often extending to the panicle, the extreme apex obtuse or abruptly pointed, in cross-section oval or circular, 5–10 mm. in diameter, a set of small bulliform cells on each side and near the mid-nerve; those of the culm a little wider, the upper one 1–5 cm. long, sheaths compressed, loose, ligule 1–2 mm. long. Panicle erect, dense, sometimes interrupted below, 4–10 cm. long, rays in twos and threes, stout, erect, the longest 3–5 cm. long. *Staminate* spikelets compressed, ovate-lanceolate or oval, 4–7 flowered, 10–15 mm. long, light green or yellowish; joint of rachilla large, soft, sparingly pubescent, 1.5–2 mm. long. Empty glumes oblong-lanceolate, soft-scabrid, 1st 3–4–5 nerved, 7–10 mm. long, 2d 3–7 nerved, 8–11 mm. long; floral glume oval, or oval-lanceolate, with soft hairs at the base and lower part of the keel; apex notched, awnless, 3–10 nerved (even on glumes from the same panicle), 8–10 mm. long, palea but very little shorter than its glume, linear, ciliate on the keels, apex notched; anthers 5 mm. long. *Pistillate* spikelets have joints of the rachilla shorter, empty glumes and floral glume a little shorter.

The compressed spikelets and conduplicate leaves point to affinities with *Poa;* the following show affinities with *Melica:* large, soft-scabrid, light green or yellowish spikelets, glumes oval, floral glume notched at the apex, not keeled, rachilla large, long and soft, empty glumes usually more than 3 nerved and floral glume often more than 5–7 nerved.

Poa macrantha, Vasey.—Specimens from T. Howell, sand dunes Tilamook Bay, Oregon; also from Dr. G. Vasey.

A Notable Collection of Botanists.

It will doubtless be of interest to botanists to know that in the Wolff collection of engravings, recently presented to the Syracuse University, many portraits of botanists are included. Of the 12,000 portraits of distinguished men of all times and from all lands included in this collection, some 6,000 have been catalogued. From this catalogue we note the names of the following botanists: *

ADANSON, Aiton, Barrelier, CASPAR BAUHIN (6), *Hieron.*

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* Names in small caps are represented in the collection in folio size; those in italics in quarto; those in Roman type are mostly in octavo, but a few are duodecimo. A number after the name indicates the number of different portraits of the man.

Bauhin, Billardiere, BLUME, BONPLAND, Bory de St. Vincent, AL. BRAUN, R. BROWN (2), BRÜCKMANN, OTTO BRUNFELS, Camerarius, Celsius, *Cesalpino*, *Clusius*, Collinson, W. CURTIS, ERASMUS DARWIN (7), CHARLES DARWIN, DESFONTAINES, Dillenius, Dioscorides, *Dodart*, Dodonæus, Doornik, EHRENBERG, ENDLICHER, Escher, FAGON, FEE, FISCHER VON WALDHEIM (4), FORSTER, J. C. FREMONT, FUCHS, GERARDE (2), GESNER (7), J. G. GMELIN (3) J. F. Gmelin (2), GÖPPERT, J. E. GRAY, GUALTER, *Hedwig*, HEER, Heucher, JOHN HILL (7), *G. F. Hoffman* (2), M. HOFFMAN, W. J. Hooker, J. Hope, Hoppe, Hornschuch, Hosack, HUMBOLDT (15), JACQUIN (4), Janichius, JAQUIN, JEPPE, JUNG, Jungerman (2), *B. Jussieu*, A. L. de Jussieu, *Kniphof*, Kramer, KUNTH, Langdorff, James Lee, LINDLEY, LINK, LINNÆUS (27), L'OBEL, J. H. LOCHNER, M. F. LOCHNER, LUDOLF (2), LUDWIG (2), Lüder, MAPPUS, Martinet (5), MARTINS (2), MATTHIOLI (6), J. C. A. Mayer, T. Mayer (2), *Mentzel* (2), MERCATUS, C. von Mertens, F. C. MERTENS, MIKAN, P. Müller, *Nævius* (5), N. J. DE NECKER (2), NEES VON ESENBECK, Neuhauser, Nicolai, Œder, J. PARKINSON (3), PELLER, Plunkenett, POHL, RAY (8). REINWARDT, RETZIUS, REVEILLIERE-LEPAUX, Rhyne, RIOLANUS, RIVINUS, ROSA, RUDBECK, RUYSCH, SCHÄFFER (10), *Schenck*, Schkuhr, SCHLEIDEN, *Schrader*, SCHRANK, Schrœtter, SLEVOGT, J. E. SMITH, *Sowerby*, Sprengel (6), Swartz (2), SWEERTINS, Tabernæmontanus, Tandler, THEMMEN, Thunberg (6), Tournefort (2), Tragus (Bock), TREVIRANUS (2), TREW, Vahl, VAILLANT (3), VATER, VROLICH, WALLICH, *Wallroth*, WANGENHEIM (2), WEBER, Wichura, WILLDENOW (6), J. B. WINSLOW, ZANNICHELLI, *Zimmermann*, ZUCCAGNIO—Total, 144 names.

It will be noted that the pre-Linnæan botanists are especially well represented. Many of the portraits are fine steel engravings, and from this every style of engraving is represented, down to lithographs, and in a few cases wood engravings. The 27 portraits of Linnæus include three folios and numerous quartos, octavos and duodecimos.

LUCIEN M. UNDERWOOD.

Review of Foreign Literature.

Die Gattungen der Pomaceen. Emil Koehne. (Wissenschaftliche Beilage zum Programm des Falk-Realgymnasium zu Berlin, Ostern, 1890, 4to, pp. 33, 2 plates.)

This is a recast of the genera of the suborder Pomaceæ, with a review of the work accomplished by earlier writers on the group, notably Decaisne, Lindley, Th. Wenzig and Focke. The author recognizes twenty-three genera, as against the nine of Bentham and Hooker, and most of the additional fourteen appear to us based on a minimum of characters Of especial interest to American botanists we note that two new species of *Amelanchier* are described—*A. Utahensis*, based on Marcus E. Jones' No. 1716, which was distributed (erroneously the author says) as *A. alnifolia*, var., and which it appears to be, and *A. Pringlei*, based on Pringle's No. 259 from the Santa Eulalia Mts., Chihuahua, distributed as *Cotoneaster denticulata.* N. L. B.

Botanical Notes.

Additions to Illinois Flora. The following species found in the vicinity of Peoria, Ill. are not in Patterson's Catalogue of Illinois plants:

Scleria verticillata, Muhl. Found in a cold peat bog in the Illinois river bottom in Woodford Co., two miles distant from Peoria. When first noticed in the summer of 1887 it was frequent at this station, but in 1888 the bog was brought under cultivation, and since, though persistently searched for, has not been met with again. I believe this station to be farther west than any previously reported.

Bromus mollis, L. Noticed the past summer in Tazenell Co., on the grades of the Toledo, Peoria and Warsaw R. R. As this road is an eastern one it is to be inferred that the species is an immigrant from the east.

Œnothera sinuata, L. The past season I found a diminutive species of *Œnothera* on the brow of the bluffs bordering Seventh Ave. and separating the upper and lower city. It covered a space of haif an acre and was abundant. I determined it as *Œ. sinuata*, and this was verified by Walter Deane, of Cambridge, Mass., who compared flowering and fruiting specimens I sent him, with specimens in Harvard herbarium. This locality would seem to be out of the usual range of the species.

FRANK E. McDONALD.

Breweria humistrata and B. aquatica. I have some specimens of Breweria from Grand Prairie, Arkansas, that combine the characters of the above species. They have the mucronate leaves and 1-7 flowered peduncles of the former, and the hairy calyx, short leaves (1′ long) and glabrous filiments of the latter. Our specimens were collected in moist ground at DuVall's Bluffs. With these intermediate specimens before me I am inclined to think that the above species are only upland and lowland forms of the same thing. We believe *Breweria* has not been before reported from Arkansas.

F. L. HARVEY.

Stellaria pubera. This plant is not very common in sonthern or middle Georgia; at least I have never found it except in one place; a wooded hillside near the city. There, in connection with the ordinary form having petals so deeply cleft that their narrow, spreading lobes appear like separate petals, occurs a variety that differs conspicuously in the shape of the organs. The petals are cleft not more than half their length, with the lobes convergent, the two forms presenting on a larger scale much the same difference in appearance that one observes between the corollas of *Stellaria media* and *Cerastium vulgatum.* Examination, however, revealed no specific difference between the two forms, the variation confining itself entirely to the shape of the petals. The two forms grow together side by side, under the same conditions, the typical form, with the deeply cleft petals, being the more abundant. Both bloom at the same time—March, and the early part of April.

MISS E. F. ANDREWS,
Wesleyan College, Macon, Ga.

Hybrid Grimmias. J. Cardot (Rev. Bryol. xvii. 18-19.) A form intermediate between *G. leucophæa* and *G. crinata* is reported from the mountains of Auvergne. We have also recently received from M. Philibert his "Observations sur L'Hybridation dans les

Mousses," and specimens intermediate between *G. orbicularis* and *G. tergestina.* E. G. B.

A hybrid Desmid. In Vol. iv, p. 171, of the Annals of Botany, Mr. A. W. Bennett describes and figures a desmid supposed to be a hybrid between *Euastrum crassum*, Ktg. and *E. humerosum*, Ralfs. It was collected on Dartmoor last August, and is stated to be the first recorded instance of hybridism among the desmids.

Index to Recent American Botanical Literature.

Alabama.—Vegetation in Southern. Carl Mohr. (Garden & Forest, iii. 212).

An account of the effect of a cold wave upon the vegetation during last March.

Algæ of the Plains.—The Fresh-water. H. J. Webber. (Am. Nat. xxiii. 1011-1013).

A list of the smaller algæ collected in a single day's trip in the Sand Hill region of Nebraska.

Alghe della Terra del Fuego raccolte del Prof. Spegazzini. F. Ardissone. (Rendiconti Reale Instit. Lombardo (II) xxi. 208-215).

A list of 45 species; *Cladophora Magellanica*, *Callithamnion spinuliferum* and *Ceramium radicans* are described as new.

Analogies and Affinities.—III. Edward L. Greene (Pittonia, ii. 51-57, May 1, 1890).

This paper is a discussion of the relationships of *Allium* to other Liliaceous genera. It is shown that *Triteleia uniflora*, Lindl., a Chilian plant, is referable to the genus *Leucocoryne*, and that the species of *Androstephium* have a strong onion-like odor. *Milla cærulea*, Scheele, becomes *Androstephim cæruleum*. *Allium unifolium* var. *lacteum*, is described as new, from San Luis Obispo Co., Cal.

Aristolochia Goldeana. (Gard. Chron. vii. 525, fig. 83).

Botanical Laboratory.—A New. D. P. Penhallow. (Can. Rec. Sci. iv. 89-93, illustrated).

A description of the laboratory at McGill University.

Botanical Terminology.—Three Suggestions on. Conway McMillan. (Am. Nat. xxiv. 366-369).

Buckleya distichophylla. C. S. Sargent. (Garden & Forest, iii. 236, fig. 37).

California Cañon.—In a. C. H. Shinn. (Garden & Forest, iii. 211-212).

An account of the vegetation in Morrison Canoñ.

California.—Native Shrubs of.—III. E. L. Greene. (Garden & Forest, iii. 198, 199).

Notes are given upon *Garrya elliptica* and *Ribes tenuiflorum.* In regard to the latter species, the author says that it has generally been confused with *R. aureum*, from which it is, however, distinct, the flowers being entirely scentless and its berries large, cherry red and without aroma.

Californian Plants.—New. J. G. Lemmon. (Pittonia., ii. 67-69).

Prunus subcordata, var. *Kelloggii ; Arctostaphylos Parryana*, and *Allium obtusum*, all from California.

Catalogue of Plants Found in New Jersey. N. L. Britton, Ph.D., with the Assistance of the Botanists of the State and Contiguous Territory, and of Specialists in the Several Departments of the Science. (Final Report of the State Geologist, ii. pp. 25-642. Reprinted. Dated 1889. Issued May, 1890).

Of this work we can say, as did Enæas of the battle of Troy, " all of which I saw and a part of which I was." Since the distribution of the interleaved copies of the Preliminary Catalogue of the Flora of New Jersey, nearly a decade since, this work has occupied the attention of perhaps a larger number of careful observers than have ever given their special attention to any similar local study. The author's introduction does not contain a list of these co-laborers, for the probable reason that it would have included the name of almost every working botanist in and about the State of New Jersey. More than one man has trodden his first steps in the paths of systematic botany since the appearance of the Preliminary Catalogue, and has progressed until able to contribute his mite to the finished work ; and upon the other hand, the book is enriched by the mature studies of such men as Porter, Martindale, Redfield and Canby. But these contributions alone could never have given us such a work as lies before us. It is much more than a mere compilation of the observations furnished by its contributors. Each individual record has been searched and verified previous to acceptation, and we imagine that there are but few of the contributors who have not been set right at least once! The rigidity with which specimens have been demanded in confirmation of notes has not always tended to the convenience of collectors, but it has excluded not a few errors from the result. Those who have become acquainted with this element of the author's work, and who have had opportunities for observing the careful scrutiny which has attended each detail, will not fail to repose great confidence in the accuracy of the observations which have been admitted to record.

Nor is this all. The author has not even contented himself with accepting the classifications—much less the names—of the works commonly recognized as authoritative, but has made exhaustive special studies, and incidentally contributed such important revisions as those of *Tissa*, *Hicoria*, *Lechea*, *Eleocharis* and *Cyperus*. And from all this has resulted a work which does not deserve to rank with the ordinary local plant catalogues. It constitutes the most important embodiment yet published, of principles which are receiving the attentive consideration by the present generation of botanists. Few of us will need to examine its pages to learn what rules of authority and citation have been followed; but there are also few of us who will not be surprised upon more than one occasion as we use the book, to note the necessities which have arisen for the correction of long accepted errors. It will take us some time to become accustomed to all the names, but we are happy in believing that very few will be ungracious enough to decline to profit by the results of ten years of such faithful labor as Dr. Britton has generously bestowed upon his task. To these authentic names are appended, in parentheses, those which are superseded, and the latter also appear in italics in the index.

The author's ideas concerning the use of the term "forma," set forth in the last number of the BULLETIN, will perhaps meet with some disfavor, but the question can hardly extend to the advisability of discriminating between forms and varieties, but only to the application of formal names. That the careful discrimination between these two classes of variations is a work that has been too long delayed must be admitted, we think, by all.

In the introduction to the work we meet with a severe disappointment. It comprises only six pages, while at least sixteen might with the greatest profit have been devoted to it. We can readily understand how fifteen years of daily acquaintance with the representatives of the different sections of the State flora might tend to make any remarks thereupon appear trite to the mind of the learned author. But the less well-informed public would have profited by some extended discussion of the characteristics of those sections—illustrations of the classification which is barely mentioned in outline. Our trap-rock flora and that of the limestone regions to the northward; the relations of the pine barren plants to those of the adjacent region; the peculiarities of our salt marsh vegetation, and those interesting plants which are mentioned as having crept into our western borders: all these would have furnished most interesting and instructive matter to thousands of readers and students who know little or nothing of them. As it is we are informed with great brevity that "our flora may thus be divided with considerable accuracy into a northern and a southern, whose present distribution has been determined by differences of soil and climate," and "the conclusion reached at the time the Preliminary Catalogue was written, that they are most naturally separated by the glacial terminal moraine, appears to be substantiated. * * * Besides these two main divisions of our flora, there is another, which may be termed the marine and coast group of plants, species and varieties especially characteristic of the sea beaches and salt or brackish marshes and meadows. Some of these are plainly forms of upland origin, which have accommodated themselves to their saline surroundings, and been thereby slightly changed in structure and appearance, so as now to be evidently distinct from their inland neighbors and relatives, while others appear to be very distinct from any other living forms. * * * This division of the flora is very uniform in character from one end of the coast line to the other, and is the most distinct and differentiated of all.

"We may also make out a fourth group of species of especial western distribution, there being a few plants mainly confined to the Delaware River valley, and reaching their greatest development in point of abundance to the west. These species have no special significance in the consideration of the origin of our flora, and might, perhaps, all be included in one or the other of the two divisions first considered."

The herbarium illustrating the work has become State property and comprises " over five thousand mounted sheets, bearing ten thousand or twelve thousand specimens."

The list of the Anthophyta (Phanerogams) occupies two hundred and seventy pages and comprises 1,919 species and varieties, 13 being Gymnosperms, 1,348 Dicotyledons, and 558 Monocotyledons. The Gymnosperms stand next preceding, in order, to the Pteridophyta. The largest natural orders of the Anthophyta are, Compositæ with 223 species, varieties and forms, Cyperaceæ 182, Gramineæ 164, Leguminosæ 76, Rosaceæ 73, Labiatæ 66 and Scrophularineæ 48. Orchideæ and Lilaceæ have each 45 representatives. Of true ferns there are 47, and of other Pteridophyta—including Ophioglossaceæ—29. Of Bryophyta there are 461. Of these the Sphagna, elaborated by Mr. E. A. Rau, number 42 ; the Musci, by Mr. Rau and Mrs. Britton, on the basis of the list in the Preliminary Flora by Mr. C. F. Parker, 312 ; the Hepaticæ by Mr. Rau, on the same basis, 96, and the Characeæ by Dr. T. F. Allen, 17. There are 3,021 Thallophyta distributed as follows : 329 lichens, from MS. by C. F. Austin, revised by Dr. J. W. Eckfeldt ; 987 Algæ, the marine by Mr. Isaac C. Martindale and the fresh-water by the Rev. Francis Wolle, combined by the author into a single series, and the Fungi, by Mr. J. B. Ellis and Mr. W. R. Gerard, to the number of 1,705. The fresh-water and marine forms of the Protophyta are, like the Algæ, divided between Messrs. Wolle and Martindale and number 164, namely, Cyanophyceæ 111, Chlorophylleæ 34, Achlorophylleæ 19.

The total number of species, varieties and forms of the entire catalogue is therefore 5,641, and elaborate tables are appended showing their distribution among the different groups. There is an ample list of abbreviations and a thoroughly perfect index, the synonyms being in italics.

The following statement, which appears on page 29, will be heartily endorsed by every one : " I have been fortunate in securing the cordial co-operation of students of all kinds of plants, and the results of their investigations have caused the present work to become the most complete enumeration of plants of any region of as great area in the world. In fact, no such systematic study of a flora has been hitherto attempted." H. H. R.

Check List of Plants, Compiled for the Vicinity of Baltimore. Basil Sellers. (Pamph. 12 mo. pp. 72, Baltimore, 1888).

An enumeration of 1,609 species and varieties of Anthophyta and Pteridophyta reported from and collected within an area twenty-five miles square, having the City Hall of Baltimore for its center. It is certainly an excellent showing for such a limited area, and we trust that the good work will be continued and arranged according to modern botanical ideas. The following closing words of the preface lead us to hope that this will be done: " Gray's Manual has been followed as closely as possible, and changes in arrangement and nomenclature, as well as notes, etc:, have been reserved for the future."

Chrysobalanaceen.—Beiträge zur Kenntniss der.—II. Karl Fritsch. (Ann. K. K. Naturhist. Hof. Museum, v. 9-14).

New species from Brazil and Guiana are described in the genera *Hirtella*, *Couepia* and *Parinarium.*

Daisy.—The European. F. H. Vaslit. (Zoe, i. 48).

The fact is noted that *Bellis perennis* has become thoroughly established in one of the glens of Tamalpais, where it has lost its "double" characteristic, under which it is so commonly known in cultivation here, and has reverted to its normal form.

Day Lily of the Desert.—The. C. R. Orcutt. (Pacif. Rural Press, April 12, 1890).

A description of *Hesperocallis undulata.*

Dendromecon.—Deformed Flowers of. T. S. Brandagee. (Zoe, i. 46-48, Pl. i.)

Teratological notes on *Dendromecon rigidum.*

Echniocactus.—Some Notes on. C. R. Orcutt. (Garden and Forest, iii. 238).

Flora of the Kurile Islands. K. Miyabe. (Mem. Bost. Soc. Nat. Hist., iv. 203-275. Plate XXII).

The Kurile Islands extend in a nearly straight line from the Island of Yezo, Japan, to Kamtschatka, separating the Okhotsk

Sea from the Pacific Ocean. There are twenty-four larger islands and numerous smaller ones. They belong to the Empire of Japan. Mr. Miyabe enumerates 317 species, the largest orders being Compositæ with 30, Rosaceæ with 23, Gramineæ with 17, Ericaceæ with 16, Caryophylleæ and Liliaceæ each with 15. About 30 per cent. of the Kurile Flora is circumboreal in distribution; of the remainder 50 per cent. is purely Asiatic, and 10 per cent. American. Two species are supposed to be endemic—*Draba hirsuta*, Turcz. and *Oxytropis pumilis*, Ledeb. A new variety of *Prunus apetala* is described. Following Dr. Maximowicz, *Rubus strigosus*, Michx. is referred to a variety of *R. Idæus*, L. The paper is a very valuable contribution to the literature of geographical botany. N. L. B.

Flora Ottawaensis. J. Fletcher. (Ottawa Nat., May, 1890).

This part (pages 74-77) enumerates the species between *Dirca* and *Alnus*.

Flowers and Insects—IV. Chas. Robertson. (Brot. Gaz. xv. 79-84).

Notes upon the insects visiting *Baptisia leucantha*, *Psoralea Onobrychis*, *Amorpha canescens*, *Petalostemon violaceus*, *Tephrosia Virginiana*, and *Desmodium sp.*, are given.

Fungi.—The Nomenclature of. H. W. Harkness. (Zoe, i. 49-50).

Geo. W. Clinton.—An Address Commemorative of. David F. Day. (Pamph. 8vo. pp. 29, Buffalo, N. Y., 1890).

This address was delivered before the Buffalo Historical Society, Mch. 24, 1890. In it may be found many memoranda of the important part which Judge Clinton took in the development of the botany of the State.

Glandular Pubescence in Aster patens. A. S. Hitchcock. (Bot. Gaz. xv. 97, 98, illustrated; also reprinted).

History of Garden Vegetables.—The. E. L. Sturtevant. (Am. Nat. xxiv. 313-332).

Cabbage, (*Brassica sp.*), Pot Marigold, (*Calendula officinalis*), Potato, (*Solanum tuberosum*), Purslane, (*Portulaca oleracea*), Quinoa, (*Chenopodium quinoa*), Radish, (*Raphanus*), Rampion, (*Campanula rapunculus*), Rhubarb, (*Rheum* sp.) and Rocambole, (*Allium scrodoprasum*), are described.

Honeysuckles.—Two American. C. S. S. (Garden and Forest, iii. 187, figs. 33, 34).

Critical notes upon and figures of *Lonicera flava* and *L. Sullivantii.*

Hypnum circinale, Hook. J. Cardot. (Rev. Bryol. xvii. 17, 18).

The author finds that all his specimens are diœcious, and believes *H. Sequoieti,* Muell. not sufficiently distinct to be a species.

Laboulbeniaceæ.—On Some North American Species of. Roland Thaxter. (Proc. Am. Acad. Arts and Sci., 1890, 5-14).

This is a preliminary communication on another group of entomogenous fungi, which, with the one already published by the author on the American Entomophthoreæ, is designed to form a monograph. In this number *Peyritschiella* and *Cantharomyces* are described as new genera with three new species, and *Stigmatomyces* and *Laboulbenia* add five more. E. G. B.

Mangroves. J. T. Rothrock. (Forest Leaves, iii. 5, 6, illustrated).

Contains representations of *Rhizophora mangle* and *Avicennia nitida.*

Mosses.—An Introduction to the Study of. Elizabeth G. Britton. (Microscope, x. 38-45 ; also reprinted).

Mycologic Observatious—I. A. P. Morgan. (Bot. Gaz. xv.84-86).

Memoranda taken in January of this year, at Preston, Ohio.

Naturalized Plants of Southern California.—Notes on the.—II. S. B. Parish. (Zoe. i. 56-59).

Nomenclature.—A Question of.—Notes on North American Trees.—XVI. C. S. Sargent. (Garden and Forest, iii. 186).

The question is in regard to the proper binomial with which to designate *Schinus Fagara* of the "Species Plantarum," afterwards changed by Linnæus to *Fagara Pterota* when he determined that it could not stand in the former genus. The author calls attention to the fact that it may be included in the genus *Xanthoxylum,* and hence proposes to pass over the several names by which it has been called from time to time, and hereafter know it under the title *Xanthoxylum Fagara* (L.) Sargent. The fact is pointed out that this specific name was applied by Linnæus under a misunderstanding, which, however, the author (and we entirely agree with him) does not consider, apparently, to have any bearing on the question.

Notes on American Plants. F. H. Horsford. (Garden and Forest, iii. 240).

Notes from Southwick, Mass., upon *Stylophorum diphyllum*, *Cardamine rhomboidea*, var. *purpurea*; *Trillium erectum*, var. *album*, *Heuchera Americana*, and *Jeffersonia diphylla.*

Pampas Grass.—The. Mrs. S. La Mance. (Vick's Monthly Mag., xiii. 146, 147, illustrated).

An account and representation of *Gynerium argenteum.*

Parry.—The Late Dr. C. C. J. G. Lemmon. (Pacific Rural Press, April 12th, 1890; illustrated).

A biographical notice with portrait.

Passiflora Miersii. (Bot. Mag. Tab. 7115).

Perityle.—A New. T. S. Brandagee. (Zoe, i. 54).

P. cuneata, from near Todos Santos, Baja California, is described as new.

Potato.—The Puruvian or American. (Garden and Forest, iii. 199, 200).

An account of the early history of the potato.

Prepusa Hookeriana. (Gard. Chron. vii. 320, f. 62).

Ranunculi.—On Some North American. Edward L. Greene. (Pittonia ii. 58-65, May 1, 1890).

R. rugulosus is a new species from California; *R. subsagittatus* is the *R. Arizonicus* var. *subsagittatus*, Gray, of Arizona, and it certainly appears distinct enough to be a species. *R. repens* has recently been found in Humboldt County, Cal. *R. obtusiusculus*, Raf. (1808) is shown to be the true name for *R. ambigens*, Wats.; *R. ovalis*, Raf. should replace *R. rhomboideus*, Goldie; *R. lacustris*, Beck and Tracy antedates *R. Purshii*, Richards. and must be adopted for the plant called in recent books *R. multifidus*, Pursh, there being an earlier *R. multifidus* of Forskall. *R. limosus*, Nutt. is claimed to be specifically distinct from this last, and a hybrid betweeen it and *R. sceleratus*, from Idaho, is described. It is important to ascertain definitely just what relation the var. *terrestris*, Gray, bears to *R. lacustris*, and we would recommend its observation to botanists of Michigan and Minnesota, where it appears to be frequent. Professor Greene has rendered valuable service in this close study of perplexing forms, which really must be studied in the field to be intelligently understood. N. L. B.

Schizonotus and Solanoa. Edward L. Greene. (Pittonia ii. 65-67).

Solanoa is proposed for *Schizonotus*, Gray, (1876) there being already a genus *Schizonotus* of Lindley, (1830), and one of Rafinesque (1838). Professor Greene believes that Lindley's genus is to be maintained.

Soja. H. H. Rusby. (Reprint from Drug. Bull., April, 1890; illustrated).

Under this name is given a description and plate of *Glycine Soja* (L.), Sieb and Zucc.

Species.—New or Noteworthy. Edward L. Greene. (Pittonia, ii. 69-81, May 1-15, 1890).

The following are new: *Sisyrinchium demissum*; *Calochortus Plummeræ*; *Calochortus invenustus*; *Calochortus excavatus*; *Calochortus amœnus*; *Dodecatheon pauciflorum* (*D. Meadia* var. *pauciflorum*, Durand); *Dodecatheon Cusickii*; *Dodecatheon crenatum*; *D. Hendersoni*, var. *cruciatum* (*D. cruciatum*, Greene); *Polemonium occidentale*; *Troximon purpureum* (*T. aurantiacum* var. *purpureum*, Gray); *Troximon Arizonicum*; *Troximon plebeium*; *Downingia tricolor*; *Downingia ornatissima*; *Downingia insignis* and *Howellia limosa*.

Taxodium distichum.—The Knees of. R. H. Lamborn. (Am. Nat. xxiv. 333-340; illustrated).

To those who have followed the recent discussions in regard to the subject, this article will contain but little that is new, even the illustrations having previously appeared in Garden and Forest.

Uredospores of Gymnosporangium.—The So-called. C. E. Bessey. (Am. Nat. xxiv. 369, 370).

Willow.—A Monœcious. C. L. Anderson. (Zoe, i. 41, 42).

The author describes what he considers to be a monœcious hybrid between *Salix Babylonica* and *S. lasiandra*.

Proceedings of the Club.

The regular meeting was held on Tuesday evening, May 14th, the President in the chair and 44 persons present.

The report of the committee appointed to consider the proposed increase in size of the BULLETIN, reported in favor of increasing the subscription price of that journal to $2.00 per annum. The report was unanimously accepted.

Reports were made on the field days held at South Amboy, Carlton Hill and New Dorp.

Dr. Britton exhibited the growing tip of the rootstock of *Nymphæa advena*, and remarked on the endogenous structure of these plants. Mr. Hogg showed the red-bracted form of *Cornus florida*, and a large number of specimens of Japanese shrubs, including the curious *Cercidiphyllum*, first introduced into America by himself and supposed to belong to the Magnoliaceæ. Miss Steele showed the albino form of *Viola canina*, var. *Muhlenbergii*, from Meadville, Penn.

The paper announced for the evening then followed: "The Life-History of the Palm Family," by Dr. Newberry, illustrated by specimens of recent and fossil palms and by lantern slides.

The second May meeting was held on Wednesday evening, May 28th, at Columbia College, the President in the chair and 17 persons present.

Judge Chas. P. Daly, Mr. H. Ries, Mr. W. Holmes, Miss Whitman, Mrs. Percival Knauth, Miss E. T. Andrews, and Miss Fannie C. Neale were elected active members.

Mr. J. B. Leiberg was elected a corresponding member.

The field committee reported finding *Conopholis Americana* at Franklin, N. J., May 17th, and *Pogonia verticillata* at Forbel's Landing, L. I., on May 24th. This latter find is a re-discovery of the plant in an old locality.

Mr. Lighthipe read the announced paper of the evening upon "Plants gathered in Florida, January and February, 1890," illustrated by herbarium specimens.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

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The Revised Manual and Some Western Plants.

By E. J. Hill.

In giving the geographical range of plants as briefly as a handbook requires, liabilities to err by trying to say much in a word or short phrase must be recognized. That all sources of information are not equally and carefully examined may also be true, and as a consequence omissions may occur and due credit fail to be given. The literature of local botany has become quite extensive; all of it is not very accessible and some likely to be overlooked. The details of geographical distribution even in a part of a large country is a subject requiring great patience in research and special aptitude for its pursuit. Some of these omissions or lapses from the ideal had been noticed in the Revised Manual. One naturally turns first to those things which are familiar to him in his own field, or to which he may have called attention somewhere, and so the error is easily detected. Prof. Porter has mentioned some in the BULLETIN for March. It is evident that the botany of the future can best be made complete by the co-operation of all who are interested, and who may have special knowledge of particular fields which they are willing to communicate, and place within easy reach of those who prepare our manuals. But first I will notice a few errors in Prof. Porter's article, if I understand the purport of his restrictions and inquiries.

One plant he mentions is *Polygala polygama*, Walt., said in the Manual to be "common." To this the remark is added, "A plant of the eastern seaboard and rare in northern New Jersey, not known in Pennsylvania." Perhaps this does not mean that the plant is confined to the seaboard, but that would be the inference. The older Manual said: "Dry, sandy soil; common eastward," not necessarily confining it to the East, but making it common only there. That the word "common" is too broad a term is plain, since it does not occur throughout, as is evident from its absence from Pennsylvania, and my experience with it in the lake region confirms this, since it is a plant local in character of habitat, though abundant in any locality adapted to its nature of growth. Its peculiar mode of growth causes it to produce abundance of seed and plant them effectually, thus securing a numerous progeny where it happens to grow. But its confinement to light or sandy soil necessarily restricts its area. Such, at least, is its character in the western region. It is found in such localities along the Great Lakes, and extends into the Mississippi basin in Illinois, Wisconsin and Minnesota. Nuttall is probably the earliest authority for its presence at the West. In his Genera (ii. 87) he says, "*P. polygama*, Ph. HAB.—In the pine forests of Lake Michigan." The plants Nuttall used in his description were not from the same locality from which Pursh obtained the species described in his Flora (ii. 465.) "the pine barrens of Carolina," for Nuttall adds to his characterization, "Mr. Pursh's plant appears to differ considerably from the one here described, but I am persuaded it is the same from a good specimen which I have seen in the possession of Z. Collins, Esq., agreeing with the Michigan plant." Its range along the Great Lakes is about equal to their extent. Macoun gives it from the Lake of the Woods at the west, to the plains of Rice Lake, north of the central part of Lake Ontario. It therefore is represented in four of the river systems or groups of North America as defined by Guyot; the Atlantic slope of the Appalachian Mountains, the St. Lawrence, the Mississippi, and the valley of the Red and Nelson that discharge into Hudson Bay.

The second plant of the list to be noticed is *Phragmites communis*, Trin. "Edges of ponds," says the Manual. "Along the coast and the Great Lakes, but not elsewhere," adds Prof. Porter. A few references will show that it is not restricted to this range either in extent or abundance. In the catalogue of the Plants of Indiana, compiled by the editors of the *Botanical Gazette*, it is accorded a station in the extreme southwestern part of the State on the authority of Dr. J. Schenck. It evidently is found throughout the State, as we learn from the preface of the catalogue that this is the meaning when localities are not specified, that of the lower Wabash being for height of stem (19 feet) and not for locality. Dr. A. J. Phinney, in a list of plants of central eastern Indiana, published in the Twelfth Report of the State Geologist, (1882) says it is common in the region embraced in his list, about four counties lying in the valley of the Ohio. Patterson, in his "Catalogue of the Plants of Illinois," states that it is "common" in the State without restriction of range. It is given by Dr. Lapham in his "Native, Naturalized, and Cultivated Grasses of Illinois," (1850). In Minnesota, on the authority of Upham, we find it "common or frequent in the edges of ponds and lakes throughout the prairie portion of the State." It is given by Arthur in the list of Iowa plants, and by Lapham in that of Wisconsin. Hence we find the upper Mississippi region well represented by *Phragmites communis.*

The third plant is *Zizania aquatica*, L. "Common" says the Manual. "Along the seaboard and the Great Lakes, but where else," Prof. Porter asks. The answer is the upper Mississippi and the Red River of the North, as can be easily shown. In fact, if we take account of its use by the Indians as a consequence of its abundance, it is a plant even more characteristic of these regions than of the seaboard and Great Lakes. It is published in all the lists cited for *Phragmites communis*, and with about the same range, though less common at the south. In Indiana, outside of the lake area, it is assigned a place in Gibson County, and in the four counties of Dr. Phinney's list. In Illinois, Patterson has it "common." In Minnesota, Upham says, "common or frequent in favorable situations throughout the State." Besides these may be mentioned Dr. Parry's "Synoptical Catalogue of the Plants of Wisconsin and Minnesota," published in Owen's Report, (Philadelphia, 1852) and Dr. Douglas Houghton, in a list appended to Schoolcraft's "Narrative of an Expedition through the upper Mississippi to Itasca Lake." He closes the list with the entry, "*Zizania aquatica*, Pursh. Illinois to the sources of the Mississippi." I do not find it in the short list prepared by De Schweinitz from plants collected by Say in connection with Long's Expedition to this region, but it is frequently mentioned in the account of the expedition compiled by Prof.

Keating,* both by its common and botanical names. Here are five states, besides some of British America, lying outside of the lake region wholly or in great part, where *Zizania* is found, generally in abundance, Indiana, Illinois, Iowa, Wisconsin and Minnesota. And this region is the one mentioned at the beginning of the paragraph.

I will now mention a few plants whose range as indicated in the Manual, is either too restricted or otherwise incorrect, as they have fallen under my notice, indicating also where information may be found concerning them.

Corydalis micrantha, Gray, should be credited to Illinois, "Sandy river banks, &c., throughout the State" (Patterson; Cat. of the Plants of Ill., 1876).

Lechea thymifolia, Michx. Abundant in the sand-barrens at the head of Lake Michigan in Ind. (Bot. Gaz., 1881 as *L. Novæ-Cæsareæ*, Austin, and in 1883 as *L. thymifolia*, Michx).

Arenaria patula, Michx, Tippecanoe Co., Ind. (Cat. of the plants of Ind. by the Editors of the Bot. Gaz., 1881). Near Chicago, Ill., (Babcock; Flora of Chicago and vicinity. The Lens, 1872). I know of no place in Illinois where it is found except here. One of these stations is west of the city at Riverside on the Desplaines River, and two on the south side, within the limits of the city, where it grows in the thin soil covering limestone rocks. As they are likely soon to be extinct by reason of the growth of population, they may be placed on record; one is 75th St., near the lake, and the other "Stony Island," near 93d St. This is an interesting example of a plant, southern in general range, that comes to the head of Lake Michigan, where some plants of a sub-alpine cast are also found. The station in Tippecanoe Co. may indicate the line of connection.

Stellaria crassifolia, Ehrh. Michigan. (Wheeler and Smith's Cat. of the Plants of Mich., 1881), given on the authority of Dr. Lyon, and without locality. For Illinois, besides the station mentioned in the Manual (Ringwood) may be given Crete, Will Co., near the Indiana State line, where I found the apetalous form of the plant in 1882.

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* Narrative of an Expedition to the source of St. Peter's River, Lake Winnepeck, Lake of the Woods, &c. Performed in the year 1823. London, 1825.

Ammania coccinea, Rottb. Has a range in Illinois as far north as Kankakee, and thence south through the State (Patterson, l. c.).

Utricularia resupinata, B. D. Greene. Lake Co, Ind. (Bot. Gaz., viii, 187). Very abundant on the east shore of Woodard Lake, Iona Co., Mich. (Wheeler & Smith, l. c.). This brings its range much farther west than Presque Isle, Pa.

Juncus Greenii, Oakes and Tuckerm. As far west as Kankakee, Ill. (Patterson, l. c.). Lake Co., Ind. (Cat. of Ind. Plants, 1881). Said in the Manual to occur on the east shore of Lake Michigan. The older edition mentioned the east side of the State near Detroit. Are these the same?

Fimbristylis spadicea, Vahl., var. *castanea*, Gray. Frequent at the head of Lake Michigan, from Chicago east. Also in three other counties of Illinois—Kankakee, St. Clair and Henderson (Patterson, l. c.). The last two border the Mississippi, St. Clair Co. being opposite St. Louis. Attention was first called to this and the preceding plant, together with *Rynchospora cymosa*, Nutt., in the Entomologist and Botanist of St. Louis, conducted by Drs. Riley and Vasey (Vol. ii. p. 384). This was in 1870, the three plants having been found growing together in Kankakee Co. All grow together in Lake Co., Ind. The *Juncus* and *Rynchospora* have the same range so far as known in Illinois and Indiana, and the *Fimbristylis* has been found with them, but with a wider range. All are representatives of eastern plants that come to the lake region and the Mississippi.

Agropyrum violaceum, Lange. Lake Co., Ind. (Cat. of Plants of Ind., 1881).

Potamogeton Robbinsii, Oakes. In Cedar Lake, Lake Co., Ind. (Bot. Gaz. 1888).

Potamogeton Hillii, Morong. N.E. Ohio, at Ashtabula. This was the locality where the specimens were found that afterwards led to its specific distinction. (Bot. Gaz., v. 53, vi. 290).

Aster ptarmicoides, Torr. & Gray, var. *lutescens*, Gray. The Manual states that this plant ranges from N. Ill to the Saskatchewan. But this is not based on facts. Having first mentioned the presence of this plant at Englewood, I may be at fault for some of this misconception. It was stated in a note in the Bot. Gaz. (xiv. 153) that it was Dr. Gray's opinion that it might have come in by the way of the lakes, or might be a remnant of a flora once continuous, since it was known to be found in British America. It was further stated that Upham thought it probable the plant grew in Minnesota, since it was found on both sides of that State, in Canada and Illinois. But the only place for it yet found in our limits, so far as I am aware, is the station originally given. When in Minnesota the past season, I had hoped to see it, but the northeastern part of the State is not suitable for its propagation. It is a plant of the prairie and plains, and would hardly come by the timbered region of the lakes to a southern locality, or be represented in its flora. If anywhere to be sought, it would rather be in the open country of the Mississippi Valley, where the streams would afford a still better means of communication.

Triglochin maritimum, L. " Salt marshes along the coast, Lab. to N. J., and in saline places in the interior across the continent." The Manual gives this range, which is well enough for extent but not accurate as to conditions. The plant is not confined to those which are saline, but is found in many places along the lakes and in the Mississippi Valley, where they do not exist. The older editions of the Manual were correct in not thus limiting it. It bears fresh water, or bog conditions, as well as *T. palustris*.

Some plants and stations may for convenience of record be added to this list, either not published before, or offered too late for insertion in the Manual.

Rosa Engelmanni, Watson. This was found last season in the sand barrens at the head of Lake Michigan, and is not uncommon. It had been to me a puzzling form of *R. blanda*, Ait., placed there for want of something better, till the description and figure in *Garden and Forest* of Aug. 7, 1889, were seen. Being at Tower, Minn., at the time, it was at once seen to be the more common form of Rose there, and on returning home in September, a comparison of fruit and foliage verified its presence here. The fruit of the Minnesota specimens was usually obovate-oblong, that of the Indiana oblong, or tapering about the same above as below, showing no punctures by insects to produce deformity, and moreover characterizing the fruit of a whole bush, it seemed a well-marked species. An occasional round or roundish fruit would appear on some bush, as though showing a tendency to mix with *R. blanda* and *R. humilis*, that grow plentifully in the immediate vicinity.

Utricularia purpurea, Walt. Found in Spring Lake, Mich., where I gathered it in 1872.

Sagina procumbens, L.. Champion Mine, Mich., 1889.

Potamogeton Robbinsii, Oakes. Republic, and Negaunee (in Goose Lake) Mich., and abundant in Chesago Lake, in eastern Minn., 1889.

P. obtusifolius, *Mert.* and Koch. Tower, Minn., 1889.

Brachytrichia Quoyii (Ag.) Bornet & Flahault.

This is the latest name for a alga, which has undergone quite a number of vicissitudes, illustrating some rather curious results of the rules of botanical nomenclature, as at present applied. In the List of the Marine Algæ of the U. S., published in 1876, Prof. Farlow mentions doubtfully as *Rivularia nitida?* a plant which he collected at Falmouth, Mass.; later in the same year it was published as No. 45 of the Alg. Am. Bor. Exs., as *Hormactis Farlowii* Bornet, Dr. Bornet having found this plant to be not the common *R. nitida* of Europe, but to belong to the same genus as *Hormactis Balani*, Thuret, a genus first separated in 1875. Soon afterwards it was discovered by comparison with the original specimens, that the *Nostoc Quoyii* of C. Agardh, from the Marianne Islands in the Pacific, was the same plant, and so in 1881 in Farlow's Manual of the Marine Algæ of New England, it appears as *Hormactis Quoyii*, Bornet. Now it has been found that the original specimens of *Brachytrichia rivularioides*, species and genus founded by Zanardini in 1872 on a plant from Borneo, are the same as our Falmouth plant; so that in the Revision des Nostocacées Hétérocystées of Bornet and Flahault, it appears under the name at the head of this paragraph. Although Zanardini's description differs entirely from the true structure of the plant, yet as the authentic specimens agree, the species must bear his generic and Agardh's specific name, they being respectively the first given.

As regards the plant itself, its occurrence on our shore is a curious phenomenon; it is widely distributed in the Pacific, having been collected at the Marianne Islands, Borneo, Ceylon and California; but its only known station in the Atlantic is at Falmouth, Mass. Its occurrence on our shore is not mentioned by anyone earlier than 1876, though it is a rather noticeable plant in midsummer, the season when most collecting is done. As to its range, I have found it abundant on the Buzzard's Bay shore at Wood's Holl, and in Quisset and Hog Island harbors, a few miles north. On the Vineyard Sound side of Wood's Holl I have looked for it for several miles along the shore, without finding a single growing plant, when at the time it was very abundant on the other side. Rev. J. D. King, who is familiar with the marine flora of Martha's Vineyard, informs me that he has never found it there; Mr. W. A. Setchell has looked for it, unsuccessfully, in Long Island Sound; and as there is no reliable report of its occurrence elsewhere on this coast, I think it safe to say that it is practically confined to a few miles of shore from Wood's Holl north.

At the southern point of this range are the extensive works of the Pacific Guano Company, which has for some twenty years brought here for manufacture large quantities of phosphate from South Carolina and the Caribbean Sea. But for several years previous to 1870 this company obtained its raw guano from Howland's Island, which is nearly in the center of the range of the alga in question in the Pacific Ocean. If we compare the dates given above, and consider the very limited district inhabited by this species here, its abundance in that district, and its absence from adjacent districts where the conditions are the same and the marine flora in other respects is identical, it seems to me at least probable that we have a case of a species introduced by human agency; probably the first case noticed among the algæ of this region.
FRANK S. COLLINS.

A Possible Natural Hybrid.

The two species of *Tragopogon* are not rare in some patches of grass-land near New Brunswick, the *T. porrifolius*, L., being the more common and very likely the older fugitive from Europe, while *T. pratensis*, L., is a smaller but none the less attractive species. A very marked difference in the color of the flowers serves to distinguish the species instantly when in bloom. The particular purpose of this note is to record the discovery of a probable hybrid between these two closely related species of salsify. One plant has been found combining the characteristics of the violet-purple species with those of the yellow *T. pratensis.* In size, the plant in question is midway between the two species; the peduncle has less of the swollen and fistulose nature of *T. porrifolius*, and is more enlarged than those of the normal *T. pratensis.* The involucral bracts surpass the flowers in the purple species, while in the yellow they are equalled, if not exceeded by the corolla tips. In our hybrid the mean is struck, with this exception that the corollas are not of as uniform a length as in the types. Two are quite short and the others are long, as if there was an indecision due to contending forces naturally expected in a hybrid. But the point that is most interestingly striking is the happy mixing of the floral colors. The ligulate corollas are of peculiar purple and yellow, not easily described in words. To say they are rose is to come near, but not to accurately name the shade. The lower part of the flowers have a decided yellow tint, so that upon looking into the center of the head the inner part is of a yellow cast, while the outer parts, the marginal flowers, have the violet predominating.

It is rarely that we have such strikingly different colors as purple and yellow in close inflorescences in species of such manifest near kinship as our two *Tragopogons*, and they open up an interesting field for experiments in artificial hybridization with reference to the permanence of colors and other questions in cross-fertilization. The supposed natural hybrid plant has been marked, and it is hoped to save seed from it and determine if possible the enduring qualities of the progeny.

BYRON D. HALSTED.

RUTGERS COLLEGE, May 19, 1890.

Botrychium simplex, Hitch., in Maryland.

So far as I am aware this plant has until recently been known from only "New England, New York and northward."* A variety, however, is found in Wyoming Territory and California. During the early part of the summer of 1888, I found *B. simplex*, Hitch., growing in an overgrown thicket near Ellicott City, Md.

There were only three small plants growing near one another. I took one and marked the exact spot of the remaining two. Next season I could find no sign of either, but nearby (foot or two) were two others which either were not there the year before or that I did not notice, although I searched the place for some time. Growing in the same thicket I may mention, among the rare ferns, at least in this vicinity, *B. ternatum*, Swz., (two vars.), as well as *Ophioglossum vulgatum*, L., which is, indeed, more plentiful in this thicket than either of the above named species.

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* It has been found on the Pocono Mt., Pennsylvania.—ED.

At first I had some doubt whether my discovery was *B. simplex* or some nearly related species. But to settle all doubts I had recourse to one better acquainted with the ferns of this country then I, and sent the plant to Prof. L. M. Underwood (whose beautiful work on the subject I have been using). He very kindly confirms my opinion. He said, " Your specimen is a medium sized form of *Botrychium simplex*, which as you say, greatly increases the range of the species as published." In conclusion, I may add that within a radius of two miles from Ellicott City I have found between twenty-five and thirty species of ferns. Among them is one rare one, not already mentioned, *Camptosorus rhizophyllus.* Ferns are, indeed, in abundance in the neighborhood of Ellicott City.

JOHN B. EGERTON.

Notes on Melica and Poa.

In the last number of the BULLETIN is an article entitled " Grasses in the Wrong Genus Cover " by Dr. W. J. Beal, in which article two species heretofore ascribed to *Poa* are transferred to *Melica.* I feel obliged to dissent from the views of Dr. Beal and will briefly give my reasons. In the genus *Melica*, so far as I am aware, the flowering glumes are always thicker than the empty glumes, and are generally rounded on the back, at least not compressed and keeled. The characters of *Melica* are well given by Dr. Thurber in Bot. Cal. Vol. 2, p. 302. Describing the flowering glumes (which he calls lower palets) he says: " Lower palet at length subcoriaceous, rounded or flattish on the back, 5 to many-nerved, the scarious tip usually blunt and entire or 2-toothed, &c." Again, " sterile flowers much the smaller and convolute together at the top of the spikelet." In describing *Poa,* he says: " Lower palet herbaceous or membrano-herbaceous, with scarious margins and top, compressed-keeled, &c."

The two *Poas* transferred by Dr. Beal agree with the characters of the genus *Poa* except in the obtuse glumes, and that is subject to much variation in other species of true *Poa.* *Poa macrantha* probably belongs to a group of polygamous or dioicious *Poas* which occur on the Pacific coast from Chili northward. In neither of the species do we find the club-shaped, imperfect, upper flowers common in *Melica*.

GEO. VASEY.

Review of Foreign Literature.

Di una nuova stazione Italiana di Galinsoga parviflora, ed Eleusine Indica; e della presenza di altre pianti esotiche nelle vicinanze di Verona. A. Goirau. (Nuovo Giorn. Bot. Italiano, April, 1890).

The following is a list of exotic plants that have been found on the plains of Lombardy, conditions favorable to their existence.

Galinsoga parviflora, in and near Verona (1888) and Milan, and elsewhere in Lombardy, where in damp places it has become a weed.

Commelina communis, Lombardy.

Eleusine Indica. In 1879 *E. Indica* was seen for the first time by M. Goirau in the outskirts of Verona, along the moat and river, growing among rubbish heaps. The next year it had spread in amazing quantities and grew in great luxuriance. In 1882 the plant was seen for the last time, shortly before the great flood of the Adige, which took place that year, after which it disappeared. Prof. de Notaris reports *E. Indica* from the Lago Maggiore; it has also been found in the Province of Bergamo and at Crespano.

Solanum Sodomæum, in 1886, had spread from cultivation in and around Verona and along the river. Two forms have been observed, one with lilac and the other with white flowers.

Stramonium Tatula is found in the outskirts of the city, probably escaped from cultivation.

Stramonium Metel is cultivated as an ornamental plant and is sporadic along with the last.

Nicandra physaloides. This beautiful Peruvian Solanacea grows in great quantities along the Adige and the railroad, and has been found at Mantova.

Tournefortia heliotropioides is spontaneous in the vicinity of Bologna, in the Parmigiano and near Verona.

Solidago serotina, frequently cultivated in gardens, is now becoming wild in the neighborhood of Lucca. From 1870 to 1882 it grew abundantly with *Aster salignus* on the banks of the Adige. The locality is now destroyed, but the plants are found in the valley Ceraino and at Avesa, nearby.

Amorpha fruticosa grows in great quantities at Peschiera and in several other places, where it has evidently been introduced, and now shows a decided tendency to propagate ltself.

A. M. V.

Botanical Notes.

Laboratory of Biological Research of the Brooklyn Institute. Through the cordial co-operation of the officers of the New York State Fish Commission, and the great personal interest of its President, Mr. Eugene Blackford, the Brooklyn institute has been enabled to open a seaside laboratory for teaching and research in zoology and botany, under the direction of Dr. Bashford Dean. The laboratory is located at Cold Spring Harbor, Long Island, thirty-two miles from New York, reached by the Long Island Railway. The session opens on Monday, July 7th, and extends over eight weeks. The fee is twenty-four dollars. The location is a capital one, and an extensive corps of lecturers on special subjects has been secured, those on the botanical side being Dr. W. G. Farlow, Dr. N. L. Britton and Prof. Byron D. Halsted.

Index to Recent American Botanical Literature.

Abies bracteata. (Gard. Chron. vii. 672, fig. 112).

Allamanda violacea. J. D. H. (Bot. Mag. Tab. 7,122).

Anthracnose, or Blight of the Oak. Byron D. Halsted. (Garden and Forest, iii. 295, 296).

In this article the "burning" and "scorching" of oak trees is described and the case is said to be due to the fungus *Glœosporium nervisequum.*

Artificial keys to the genera and species of Mosses recognized in Lesquereux and James' Manual of the Mosses of North America. Chas. R. Barnes. (Trans. Wisc. Acad. Sci. Arts and Letters, viii. 12–81, reprinted. Price 50 cents, 12 for $5.00).

The price of this well printed, serviceable little pamphlet, should place it in the hands of all students of American mosses, and we hope the excellent advice given in the preface will be followed by them. The first twenty-three pages are reprinted from the generic key published in 1886 with the addition of *Eucladium* and a few corrections. The keys to the species include also such recent additions as are well authenticated by exsiccatæ or by descriptions and figures with foot-note references. The following corrections may be noted: Page 65, as a foot-note to *Hookeria Sullivanti*, it should be stated that Mueller considers this a synonym of *Pterigophyllum lucens*. *Hypnum occidentale* is omitted also, and we learn from Dr. Watson that Hall's specimens are not to be found in the James Herbarium.

E. G. B.

Astragalus—A handsome. C. C. Parry. (West Am. Sci. vii. 9, 10).

A new variety is proposed, provisionally, from red-flowered specimens collected on the western borders of the Colorado Desert, to be known as *Astragalus Purshii*, Dougl. var. *coccineus.*

Botanical Generic Names Identical or too Nearly Alike. H. W. Harkness. (Zoë, i. 84, 85).

Nine identical and thirteen similar comparisons are made. From the list it appears that our friends, the mycologists, are mostly responsible for this duplication of names.

Carex rigida, Good. and its Varieties. L. H. Bailey. (Journ. Bot. xxviii. 171-173).

Professor Bailey takes up this older name for *C. vulgaris*, Fr., and refers to it a large number of varieties, those of American distribution being var. *Bigelovii*, Tuckm., var. *Goodenovii*, var. *strictiformis*, and var. *bracteosa.*

Central Nebraska—The Flora of. H. J. Webber. (Am. Nat. xxiii. 633–635; xxiv. 77–78).

An account of the botanical features of a trip to the valley of the Dismal River.

Closterium—A Note on. A. C. Stokes. (Microscope, x. 168-171).

Collemaceæ and Allied Groups—On the Carpologic Structure and Development of the. Wm. C. Sturgis. (Proc. Am. Acad. Arts and Sciences, xxv. 15-52, Plates I-VIII. Reprinted).

This is another of this year's contributions from the Cryptogamic Laboratory of Harvard University, of which Prof. Farlow may be justly proud. The illustrations alone stamp it as a fine piece of work; fifteen species in the following genera are figured: *Sticta*, *Peltigera*, *Nephroma*, *Pannaria*, *Heppia*, *Hydrothyria*, *Physma*, *Leptogium* and *Collema*. E. G. B.

Congress of Botanists—An Internatianal. J. C. A. (Bot. Gaz. xv. 119–121).

A suggestion that an attempt be made for an International Congress in connection with the World's Fair. The Congress might be held at the place of meeting of the A. A. A. S. or elsewhere, according to local attractions. A number of foreign botanists are pretty sure to be in America at that time, and if a special occasion were made, doubtless others would attend. The suggestion seems to us a timely one.

Convolvulus occidentalis, Gray. T. S. Brandegee. (Zoë, i. 85, 86).

An argument against the specific difference between this plant and *Convolvulus macrostegius*, Greene.

Coprinus from Montana—Notes on a. J. B. Ellis and B. M. Everhart. (Microscope, x. 129-131, Pl. iv).

A new species is described and figured under the provisional name of *Coprinus sclerotigenus*.

Cotton Plant—A Microscopic Study of the. P. H. Mell. (Am. Month. Mic. Journ. xi. 97-106, illustrated).

Crowfoot—The Yellow Water. Chas. E. Bessey. (Amer. Nat. xxiv. 475).

Alluding to Professor Greene's recent restoration of the name *R. lacustris*, Beck and Tracy, to this plant, and to the fact pointed out by that investigator that its duration appears to be unknown, Dr. Bessey states that it probably grows about a year. This is hardly its habit on Staten Island, where it certainly appears to be perennial. The especial evidence that I have of this, is the case of a small pond where it grew abundantly some years ago, but bloomed only once in six years, and of another where I observed the green and growing plant in March of the present season. The plant which goes for var. *terrestris* may, however, be an annual. There is opportunity for some nice observation here.

N. L. B.

Curled Leaf. H. W. Harkness. (Zoë, i. 87, 88).

The possibility is expressed that the fungus which infests the leaves of *Æsculus Californica* may be identical with *Ascomyces deformans* so well known and dreaded in the peach orchards.

Elm—The American. (Garden and Forest, iii. 281, 282, illustrated).

Contains an excellent representation of a typical New England country road and tree of *Ulmus Americana.*

Embothrium coccineum. (Gard. Chron. vii. 716, fig. 121).

Encelia farinosa, Gray. T. S. B. (Zoë, i. 83).

The author states that "this species has received a synonym by the publication of *Encelia radians* in Proc. Cal. Acd. Ser. A., ii. 176," which was founded upon a low smooth form, without the characteristic tomentum. Its local name is "incienso," on account of the gum from it, which is burned as incense in the churches.

Escapes in the Coast Range. Frank. H. Vaslit. (Zoë, i. 86).

The following plants are noted as having escaped and become naturalized: *Scabiosa atropurpurea*, *Dipsacus fullonum*, *Vinca major* and cultivated *Chrysanthemums*, which latter are stated to be "rather troublesome to get rid of."

Euphorbiaceæ—Contributions to North American—II. C. F. Millspaugh. (Pittonia, ii. 82–90; reprinted).

This includes I., "Upon *Euphorbia serpyllifolia*, Pers. and its Forms," a critical study of this wide-spread and variable species; three varieties are recognized: var. *consanguinea*, to which are referred plants by other writers considered the same as the African *E. sanguinea*, Hochst. & Steud.; var. *Neo-Mexicana* (*E. Neo-Mexicana*, Greene), and var. *rugulosa.* Under II, "Notes upon some New or Noteworthy Species," *E. pseudoserpyllifolia* from Arizona, *E. Greenei* from Idaho, *E. Laredana* from Texas, *E. Jonesii* from Arizona, and *E. dentata*, var. *gracillima* from Arizona are described as new, and interesting facts concerning other species are recorded. *Croton Sonoræ*, Torr., is Mr. Reverchon's No. 1595 from Texas. N. L. B.

Garrya elliptica. E. Molyneux. (Garden, xxxvii. 501, illustrated).

Representing the appearance of a porch covered with it in the south of England, where it is evidently a favorite in cultivation.

Geology of Artesian Wells at Atlantic City, N. J. Lewis Wool-man. (Proc. Acad. Nat. Sci. Phil., Part I, 1890, 132-144).

Contains a complete list of the diatoms found, as noted in the BULLETIN, Vol. xvi. Nos. 3 and 8.

Grass—A New. Geo. Vasey. (Bot. Gaz. xv. 106-110, Pl. xii.).

A new genus and species is founded upon specimens collected by Dr. Edward Palmer at La Paz, Lower California. Its relationships are with *Uniola* and *Distichlis*. The name proposed for it is *Rachidospermum Mexicanum.*

Grasses in the Wrong Genus. W. J. Beal. (Bot. Gax., xv. 110-112).

The genera *Stipa* and *Oryzopsis* are considered in this article, with the result of placing *Stipa Richardsoni*, Link, *S. Mongolica*, Turcz., *S. caduca*, Scribner, and *S. Pringlei*, Scribner, in the genus *Oryzopsis*

Isles de la Madeline.—Liste des Plantes Rencontrer aux. L'abbé L. Provancher. (Le Nat. Canadien, xix. 346).

Isoëtes echinospora, Durieu.—*Die Ersten Keimungs stadien der Makrospore von.* Douglas H. Campbell. (Ber. d. Deutsch. Bot. Gesellsch., viii. 97–100, t. V.; reprinted),

Lemaneaceæ of the United States—Monograph of the.—Geo. F. Atkinson. (Annals of Botany, iv. 177–229, Pl. vii. viii. ix.).

This order of fresh water Algæ has been made the subject of critical study by Prof. Atkinson for the past five or six years, and his results are embodied in this exhaustive monograph. The plants inhabit turbulent water, rapids, mill-dams, etc., growing generally at a depth of a foot or more. The morphology is treated of under the three stages in their life history. (1) The prostrate or permanent form, which in autumn gives rise to (2) the *Chantransia*-form and (3) the sexual shoot, which is developed from the latter, the period of fertilization being in spring. The development of the reproductive organs on this sexual shoot, of the protonema, the germination of the spores and the processes of fertilization are described in detail. In the systematic part of the paper all the seven United States species of *Lemanea*, the only genus recognized, are thoroughly described. It is to be regretted that the generic name *Apona*, Adans, which has long priority, was not taken up. The plates illustrate the morphology and anatomy of the plants in the greatest detail. N. L. B.

Lepidium Virginicum in Francia—L. Michelletti. (Nuovo Gior. Bot. Ital. April, 1890).

Lepidium Virginicum, first mentioned in France in the Flora de France of Grenier and Godron (1848) as naturalized in a single spot, the lazaretto of Bayonne, has spread in the departments of Landes and Basses Pyrenees, where it is now established in waste places and along railroads.

Darracq, a pharmacist at Dax, unwilling to admit that a plant so common should not be indigenous, made a new species of it, *L. majus*. It has been compared with the American plant, and, as they are identical, the new name has perforce been dropped. In 1881, on the banks of the Meurthe, near Nancy, a few specimens of *L. Virginicum* were found among growths of *L. ruderale* and two other adventive American plants a *Gilia* and *Amsinckia lycopsioides*. They lasted about ten years, and disappeared along with the manufactory of flannel shirts, to which they probably owed their origin in that place, as the wool used in the looms (presumably brought from Chili) was cleaned in the river and spread on its pebbly banks to dry.

L. Virginicum disappeared with the rest of the foreigners, but several years later was found again near Nancy, and with *Poa poœoides* and *Salvia verticillata* is spreading along the railroads.

Œnothera biennis and *O. muricata* are adventive on the banks of the Moselle, and abundant there. A. M. V.

List of Plants collected in Alaska in 1888. Geo. Vasey. (Proc. Nat. Mus. 1889, 217, 218).

This list is compiled from the specimens collected during the cruise of the U. S. Fish Commission steamer Albatross.

Mesocarpus pleurocarpus. W. J. Beal. (Microscope, x. 172-174, figs. 1, 2, 3).

New or Noteworthy Species, VIII. Edward L. Greene. Pittonia, ii. 100-106.

Vancouveria parviflora, *V. hexandra*, Greene, var. *chrysantha*, *Ceanothus vestitus*, *Saxifraga ledifolia*, *Parnassia Californica*, *Selinum eryngiifolium*, *Sium heterophyllum*, *Mentzelia affinis*, *Brickellia rhomboidea*, *Downingia montana*, *Eunanus pulchellus*, *Amarantus carneus*, *Juncus uncialis*, and *Sisyrinchium Elmeri* are all described as new.

Notes on North American Trees—XVII. C. S. Sargent. (Garden and Forest, iii. 260).

The author takes for discussion in this article the West Indian Birch or Gum Elemi, which is native in southern Florida. In the first addition of the "Species Plantarum," it is described under the name *Pistacia Simaruba*, but in the second edition the genus *Burseria* of Jacquin was accepted, modified, however, to *Bursera*. The curious fact in this connection is noted that while the second edition of Linnæus' work is dated 1762, he quotes correctly Jacquin's figures of *Bursera*, although the work in which this appears bears the date 1763. The author considers it probable that Jacquin submitted his figure and description to Linnæus' before they were actually published. The name *Bursera Simaruba* is therefore proposed for this tree.

Notes on West American Plants. Katherine Brandegee. Zoë, i. 82, 83).

New, or little known localities, in California are described for ten species and varieties of plants.

Pachysandra procumbens. (Am. Garden, xi. 346, illustrated).

Parry—Charles Christopher. C. R. Orcutt. (West. Am. Sci. vii. 1-5, illustrated).

Biography and portrait.

Palmerella. Edward Palmer. (West. Am. Sci. vii. 8, 9).

A little controversy is started in regard to priority in the discovery of *Palmerella debilis*, Gray, and incidentally as to its generic position and whether we should know it as *Lobelia Rothrockii* or *L. Dunnii.*

Perityle—Preliminary Notes on. J. N. Rose. (Bot. Gaz. xv. 112-119, Pl. xiii; also reprinted).

The following new species and varieties are described. *P. Brandegeana*, *P. Rothrockii*, *P. Greenei*, *P. Socorrosensis*, *P. Grayi*, and *P. Emoryi*, Torr. var. *Orcutti.* Enlarged representatives of the akenes are given for *P. Fitchii*, *P. Brandegeana*, *P. Californica*, *P. cuneata*, *P. microglossa*, *P. Emoryi*, var. *Orcutti*, *P. Greenei*, *P. Grayi*, and *P. Socorrosensis.*

Pinus glabra. Carl Mohr. (Garden and Forest, iii. 295).

A popular account of this pine in its native habitat and the vegetation accompanying it.

Plants from the Andes—New. Edmund G. Baker. (Journ. Bot. xxviii. 161, 172; t. 207).

Helosis Whymperi from Ecuador is described and figured; a list of four fungi, among them *Cantharellus Whymperi,* a new species from the same locality, a description of which is given by Messrs. Massee and Murray.

Provisional List of the Plants of the Bahama Islands. John Gardiner and L. J. K. Brace, with notes and additions by Charles S. Dolley. (Proc. Acad. Nat. Sci. Phila., 1889, 349-426; reprinted).

This list, already mentioned in the BULLETIN, enumerates 621 species of plants as indigenous, introduced and cultivated in the Bahamas. It is based mainly on a list made by Mr. Gardiner, while scientific adviser to the Board of Agriculture of the Bahamas, in 1886, and on a catalogue of the plants of New Providence, made some years previously by Mr. Brace. The common names of the plants are given, as well as memoranda of their actual or supposed economic uses. Some few additions have been made by Professor Dolley and others from Mr. Herrick's collection on Abaco and adjacent islands. (Johns Hopkins Univ. Circ. vi. 46).

As the extensive collections now being made by Dr. and Mrs. Northrop will soon be available for study, it may be worth while in this connection to indicate the material now available from which a reasonably complete enumeration of Bahaman plants may be brought together:

(1) A few species were collected by Catesby early in the 18th century, and some of them figured in his "Natural History of Carolina," 1754.

(2) A collection of about 100 species was made by Mr. Wm. Cooper, for Dr. Torrey, at New Providence, in 1859, and are preserved, with a partial manuscript list by Dr. Torrey, in the Columbia College Herbarium.

(3) Grisebach's "Flora of the British West Indian Islands," 1864, records something less than 200 species from Bahama, based mainly on a collection made by a Mr. Swainson, and transmitted to Sir Wm. J. Hooker. These plants are at Kew.

(4) Mr. L. J. K. Brace, one of the authors of the work here

reviewed, transmitted to Kew during the years 1880 and 1887, seven parcels containing 525 nnmbers.

(5) In 1887, a committee of the British Association for the Advancement of Science, appointed for the purpose of exploring the flora of the Bahamas, sent Baron Eggers out as collector, and he obtained 314 species. These are at Kew, together with a manuscript catalogue, and a duplicate set at South Kensington. The report of this committee is published in the Proceedings of the British Association, at the Bath meeting, 1888, and reprinted as a 3-page pamphlet, giving much valuable information. The collection was named by Mr. Baker.

(6) Mr. F. H. Herrick made a small collection in June, 1886, on the island of Abaco, an account of which, with determinations of the species by Prof. D. C. Eaton and Mr. W. A. Setchell, is printed in Johns Hopkins Univ. Circ. vi. 46, 47, 1886; specimens of these are extant.

(7) The collections of Prof. Dolley, preserved at the University of Pennsylvania.

(8) Those of Dr. and Mrs. Northrop, a considerable portion of which are already received. N. L. B.

Rosa Sayi. L. H. B. (Am. Garden, xi. 362, Pl. I.).

Rusts, Smuts, Ergots and Rots. Byron D. Halsted. (Pamph. 8vo., pp. 21, illustrated).

An address delivered before the N. J. Board of Agriculture, Jan. 31, 1890. *Phytophthora infestans* and *Claviceps purpurea* are figured, besides representations of *Puccinia, Ustilago* and *Tilletia*, sp.

Stamens of Solanaceæ—Notes upon. Byron D. Halsted. (Bot. Gaz. xv. 103–106, Pl. xi; also reprinted).

Read before the Biological Section of the A. A. A. S., Toronto meeting.

Symphoricarpus occidentalis. C. S. S. (Garden and Forest, iii, 296, fig. 42).

The True Grasses. By Edward Hackel. Translated from Die Naturlichen Pflanzenfamilien. F. Lamson Scribner, and Effie A. Southworth. Copiously illustrated (New York, Henry Holt & Co., 1890. 8vo, pp. viii. + 228. $1.50).

In Engler and Prantl's Naturlichen Pflanzenfamilen are brought together, in concise but comprehensive manner, general accounts of each of the orders of plants, accounts especially valuable and authoritative, since they are first prepared by specialists in those orders and then made to conform to the rest of the work by passing through the hands of the editors. The present book is a translation of a portion of this work. Part I, following the preface and an introduction, illustrating the use of the analytic key, is a most excellent account of the principal features, especially the morphology of the order. Part II is an analytically arrayed conspectus of the tribes and genera, with descriptions; the whole interspersed with remarks upon the more important scientific or economic facts, and copiously illustrated with good figures. The translators have combined a thorough understanding of technical German with a special knowledge of grasses, and the resulting translation is accurate, clear and scientifically correct. The only point of criticism is an occasional too close adherence to the original idiom. The title might better have been simply "The Grasses," for in "Echte Gräser" the adjective serves only to distinguish the name from others containing the same root-word, as "Riedgräser" (sedges). The English terminology does not require the distinguishing mark.

The book will be a valuable aid, especially in method, to the American student of grasses. F. V. COVILLE.

Tillandsia amethystina. J. G. Baker. (Bot. Mag. Tab. 7121.).

Tuomeya fluviatilis, Harvey—Concerning the Structure and Development of. Wm. A. Setchell. (Proc. Am. Acad. Arts and Sci. xxv. 53-68. figs. 1-15; reprinted).

The rediscovery of this long-lost fresh-water alga by our friend Mr. Isaac Holden and several other New England collectors, and the excellent description and figures by Mr. Setchell, will awaken much interest and set collectors from Maine to Alabama searching for it. The comparison of *Tuomeya* with *Batrachospermum* and *Lemanea* prove them to be closely allied. E. G. B.

Proceedings of the Club.

JUNE 10TH, 1890.

The Vice-President in the Chair, and 21 persons present.

The following persons were elected Corresponding Members:

Prof. Hoffman, Rodney, Miss.; Miss Verona Maple, Glenville, W. Va.

The Editor announced that the fourth and concluding number of Volume I. of the Memoirs, containing Dr. E. Lewis Sturtevant's paper on "Seedless Fruits." had just been distributed, and that No. 1 of volume II., containing Professor Halsted's paper on "Reserve Food Supply of Twigs and Buds," would probably be printed during the summer.

Dr. Rusby reported the discovery of *Caltha flabellifolia*, near Canadensis, Penn., and remarked on the different time of flowering of *Rhododendron nudiflorum* and *R. canescens* at that locality, the former being considerably earlier.

Dr. Britton gave a preliminary account of the recent trip of several members of the Club to southwestern Virginia, a complete description of which will appear later in the BULLETIN.

JUNE 25TH, 1890.

The President in the Chair, and 18 persons present.

The following persons were elected Active Members: Mr. Thomas Craig; Miss Mary B. Dennis; Mr. William Lowey; Dr. Alonzo Pettit and Mrs. Pettit; Mrs. A. W. Dimock and Miss Mabel Dimock.

Dr. Rusby exhibited a specimen of *Calopogon tuberosus* with 13 flowers, from Little Falls, N. J., and spoke of his list of corrected plant-names selected from Dr. Britton's recent catalogue of the plants of New Jersey, a copy of which he proposed to mail to each member of the Club.

Judge Brown spoke of the great abundance of *Veronica officinalis* in the southern Alleghenies, and of his conviction that the plant is native in that region.

Dr. Britton stated that *Leontodon hirtus* of Europe had recently been detected in southern New Jersey by Rev. Dr. J. E. Peters, and remarked on the occurrence of *Cleome pungens* at Camden and Burlington, N. J.

Dr. Newberry mentioned some of the botanical facts noted in his recent trip to Colorado.

Dr. Rusby read the announced paper of the evening, "A Memoir of Dr. Geo. Thurber."

Club then adjourned until the last Wednesday in September.

MISSOURI
BOTANICAL

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVII.] New York, August 12, 1890. [No. 8.

A Descriptive List of Species of the Genus Heuchera.

By Wm. E. Wheelock.

The genus is accepted as defined by Bentham and Hooker, Gen. Pl. i. 638.

The description of the calyx given below, including its dimensions, refers in every case to the calyx at the time of flowering; the fruiting calyx being, as a rule, much larger and quite different in form.

- § 1. Stamens exserted sooner or later.
  - † Flowering calyx 1″ to 1½″ long.
    - * Inflorescence loosely paniculate or cymose-paniculate.
      - 1. *H. Rugelii.*
      - 2. *H. glabra.*
      - 3. *H. micrantha.*
      - 4. *H. villosa.*
    - ** Inflorescence cymose-subspicate.
      - 5. *H. minutiflora.*
    - *** Inflorescence a long, narrow panicle; flowers clustered.
      - 6. *H. pilosissima.*
  - †† Flowering calyx 1½″ to 3″ long.
    - * Inflorescence a large, densely flowered, narrow thyrsus.
      - 7. *H. maxima.*
    - ** Inflorescence paniculate or cymose-paniculate.
      - 8. *H. Americana.*
      - 9. *H. longipetala.*
      - 10. *H. Orizabensis.*
      - 11. *H. rubescens.*
    - *** Inflorescence glomerate-spicate, often secund.
      - 12. *H. bracteata.*
  - ††† Flowering calyx 3″ to 5″ long.
    - * Inflorescence an open, spreading panicle.
      - 13. *H. pubescens.*
    - ** Inflorescence a narrow panicle.
      - 14. *H. hispida.*

§ 2. Stamens always included.
† Flowering calyx 1″ to 2″ long.
‡ Flowering calyx campanulate.
* Inflorescence a long, narrow, racemose panicle.
15. *H. Nova-Mexicana.*
** Inflorescence a short racemose panicle.
16. *H. Hallii.*
‡‡ Flowering calyx almost rotate, limb flat, dilated.
17. *H. parvifolia.*
†† Flowering calyx 2″ to 5″ long.
* Inflorescence a loose, few-flowered raceme.
18. *H. racemosa.*
19. *H. Williamsii.*
** Inflorescence thyrsoid.
20. *H. sanguinea.*
*** Inflorescence more or less spicate.
21. *H. cylindrica.*

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§ 1. Stamens exserted sooner or later.
† Flowering calyx 1″ to 1½″ long.
* Inflorescence loosely paniculate or cymose-paniculate.

1. H. RUGELII, Shuttlew.; Kunze, Linnæa, xx. 43, (1847).

Slender stems, 6′–2° high, and also petioles, glandular-hirsute to lanate-villous; leaves 2′ to 5′ broad, round-reniform, slightly 7 or 9 lobed, lobes broad; calyx at time of flowering campanulate, about 1″ long, beset with scattered soft hairs; petals small, linear-spatulate, two to three times as long as calyx lobes; stamens much exserted.

North Carolina.—Broad River, Rugel, Porter; Macon Co., Boynton; Burke Co., Torr. Herb.; Transylvania Co., J. D. Smith. *Tennessee.*—Warmsprings, Rugel; Cumberland Mts., Gattinger. *Illinois.*—Union Co., French; Makanda, Forbes.

2. H. GLABRA, Willd.; Rœm and Schult. Syst. vi. 216, (1820).

Tiarella colorans, Graham, Edinb. Phil. Journ., 349, (1829).

H. divaricata, Fisch.; Seringe, D.C. Prodr. iv. 51, (1830).

Slender; stems, usually bearing one or two leaves, 1° to 2° high, almost glabrous up to the minutely glandular pedicels; root-leaves 2′ to 3′ broad, glabrous or nearly so, incised, lobes 7 or 9, acute; calyx at time of flowering about 1″ long, campanulate, glandular-pubescent; petals rather narrowly spatulate with a slender claw, about three times as long as calyx lobes; stamens much exserted.

Oregon.—Tolmie. *Washington.*—Tweedy; Base Mt. Paddo

(Adams), Suksdorf, No. 546; Fort Vancouver, Hooker. *British Columbia.*—Tolmie, McKay; Selkirk Range, Macoun; Norfolk Sound, Eschscholtz; Observatory Inlet, Scouler. *Alaska.*—Sitka, Bischoff, Bongard; Popoff St., Dall.; Kodiak, Kellogg, No. 257; Harrisburg, Meehan.

3. H. MICRANTHA, Dougl.; Lindl. Bot. Reg. xv. t. 1302. (1830).
   H. Barbarossa, Presl. Rel. Hænk. ii. 56, (1835).

Stems, usually bearing a few leaves, 1° to 2° high, glabrous or slightly villous with rusty hairs; petioles and larger veins of the leaves on the lower surface more or less villous; root-leaves 2′ to 3′ broad, ovate-cordate, unequally 5 to 9-lobed, veins on lower surface distinct; calyx at time of flowering campanulate, about 1″ long, lobes sparsely covered with fine hairs; petals narrowly spatulate, two to three times as long as calyx lobes; stamens moderately exserted.

Mexico.—Hacienda de Regla, Dr. Halsted. *California.*—Monterey, Parry; Nevada Falls, Redfield, No. 97; Marin Co., Vasey, No. 174; Yosemite Valley and Mts., Torrey, No. 151; Yosemite Valley, Brewer, No. 1,667; Yuba, Bigelow, Bridges, No. 128; Aptos, Pringle, Bolander, Nos. 2,463 and 6,351; Oakland Redwoods, Bolander, No. 121; San Luis Obispo, Palmer, No. 124; Cañon S. of Diablo, Brewer, Nos. 1,100 and 1,155; Plumas Co., Mrs. Ames; Spanish Peak, Mrs. Austin; Oakland Hills, Kellogg and Harford, No. 243; Mendocino Co., Vasey, Bolander, No 6,531; Santa Lucia Mts., G. R. Vasey, No. 173. *Oregon.*—Nuttall, Lieut. Mullen, Elihu Hall, No. 159; Klickitat Co., Suksdorf. *Washington.*—Yakima, Brandegee, No. 298; Cascades, Kellogg and Harford; Columbia River, Nuttall, Suksdorf, Scouler, Barclay; Puget Sound, U. S. Explor. Exp. *Vancouver's Island.*—Lyall, Macoun; Mt. Benson, Macoun. *British Columbia.*—Agassiz, Macoun; Franklin's Journey, Hooker; Victoria, Dawson.

4. H. VILLOSA, Michx., Fl. i. 172, (1803).
   H. caulescens, Pursh., Fl. i. 188, (1814).
   H. acerifolia, Raf., Med. Fl. i. 241 and 244, (1828).
   H. parviflora, Bartling, Ind. Sem. h. Gœtt., (1838).
   H. Curtisii, Gray, Amer. Journ. Sci. (I.), xlii. 15. (1842)?

Stems, naked or bearing a few small leaves, 1° to 3° high, at base villous with rusty hairs, as are also the petioles and the larger veins on the lower surface of the leaves; the entire plant, in some specimens, nearly or quite glabrous; root-leaves 3′ to 5′

broad, acutely or obtusely 7 or 9-lobed; calyx at time of flowering about 1″ long, campanulate; petals linear-spatulate, about twice as long as calyx lobes; stamens much exserted.

The species as here accepted exhibits a remarkable variety of leaf forms.

West Virginia.—On New River, Porter. *Virginia.*—Porter; Natural Bridge, Gray and Carey, Dr. and Mrs. Britton; South Peak of Otter and Bedford Co., Curtiss; Giles Co., Canby, Redfield; Wytheville, Shriver. *North Carolina.*—Porter, Curtis, Carey, Vasey; Mitchell Co., Redfield; Macon Co., Highlands, J. D. Smith; Rich Mts., Transylvania Co., J. D. Smith. *South Carolina.*—Nuttall; Cæsar's Head, J. D. Smith. *Tennessee.*—Warmsprings, Rugel; Cumberland River, Nashville, Canby; Roan Mt., Dr. and Mrs. Britton; Mountains, Gattinger. *Kentucky.*—Lexington, Short; Banks of Kentucky River, Peter. Glabrous forms. *South Carolina.*—Bridal Vail Falls, J. D. Smith. *Georgia.*—Tococa Falls, Curtiss, No. 860.

The specimen on which *H. Curtisii* was founded does not appear to exist in either the Torrey or the Gray Herbarium.

** Inflorescence cymose-subspicate.

5. H. MINUTIFLORA, Hemsley, Diag. Pl. Nov. pars iii. p. 50, (1880).

"Stems, often bearing three or four leaves, 1° to 1½° high, villous below, as are also the petioles; leaves round-cordate, 1′ to 2′ broad, somewhat lobed, crenate-denticulate, 7 nerved, smoothish on both sides; calyx at time of flowering about 1″ long, rather broadly campanulate, lobes oblong, obtuse; petals linear, hardly longer than calyx lobes; stamens included at first, but at length slightly exserted."

South Mexico.—Popocatapetl, H. Christy, (fide Hemsley).

*** Inflorescence a long, narrow panicle; flowers clustered.

6. H. PILOSISSIMA, Fisch. and Mey., in Ind. Sem. h. Petrop. v. 36, (1838).

H. hispida, Hook. and Arn. Bot. Beechey, 347, (1841); not of Pursh.

H. hirtiflora, Torr. and Gray, Fl. N. A., i. 582, (1840).

Villous with rusty, viscid hairs; stems, usually bearing a few leaves, 1° to 2° high; root-leaves rough, 2′ to 3′ wide, broadly ovate-cordate, lobes rather obtuse, crenate-dentate; calyx at time of flowering short and broad, open, about 1½″ long, densely hairy; petals narrowly spatulate, hardly longer than calyx lobes; stamens very slightly exserted.

California.—Douglas, Coulter, No. 182, Kellogg and Harford, No. 245; Big River, Mendocino City, Bolander, No. 4,830.

Var. HARTWEGI, Watson, in Herb. Gray.

Panicle loose and more open; stems 2° to 3° high; the entire plant, but especially the calyx, less hairy.

California.—Hartweg. No. 1,742; Clark's Creek, S. Luis Obispo, Palmer, No. 124; Mendocino Co., Bolander, with 4,830 and=4,820; Santa Lucia Mts., Brandegee, Vasey, No. 173.

This plant seems to stand between *H. micrantha* and *H. pilosissima*, often much resembling the former in its foliage as well as in the shape of its panicle.

†† Flowering calyx 1½″ to 3″ long.

* Inflorescence a large, densely flowered, narrow thyrsus.

7. H. MAXIMA, Greene, Bull. Calif. Acad. Sci. ii. p. 149, (1886).

Stout leafy peduncles and equally long petioles villous, or hirsute and glandular, arising from brown, ½′ thick, decumbent stems, rough with the persistent bases of former leaves; leaves large, round-cordate to broadly-ovate cordate, 3′ to 6′ broad, obtusely 5 to 9-lobed, lobes crenate-dentate, the teeth bristle-pointed, ciliate; calyx at time of flowering rather short-campanulate, somewhat acute at base, minutely glandular, 2″ to 3″ long, lobes obtuse, pubescent; petals 1″ to 1½″ long, lanceolate with a prominent central vein; stamens slightly exserted.

Island Santa Cruz, Coast of California, Greene.

** Inflorescence paniculate or cymose-paniculate.

8. H. AMERICANA, L. Spec. Pl. i. 226, (1753).

H. scapigera, Mœnch, Meth. 674, (1794).

H. cortusa, Michx. Fl. i. 171, (1803).

H. viscida, Pursh, Fl. i. 187, (1814).

H. foliosa, Raf., fide spec. Herb. Torr.

H. reniformis, Raf. in Herb. Phil. Acad.

Stems more or less glandular–hirsute, 2° to 3° high, naked, or bearing a few small leaves; root-leaves 3′ to 4′ broad, ovate-cordate, with 7 or 9 rounded, crenate-dentate lobes, the older leaves usually with short, scattered hairs on the upper surface; calyx at time of flowering broadly campanulate, open, 1½″ to 3″ long, minutely glandular; petals very small, usually not projecting beyond calyx lobes; stamens much exserted.

Ontario.—Amherstburg, Macoun. *Connecticut.*—Wheelock. *New Jersey.*—Beck; Princeton, Torrey; Hudson Co, D. C. Eaton. *Pennsylvania.*—Near Philadelphia, Redfield; Chester Co., Canby; Easton, Schweinitz. *Delaware.*—Wilmington, Canby. *Washington, D.C.*—Vasey, Ward. *Virginia.*—Harper's Ferry, Porter; Wytheville, Shriver; Bedford Co., Curtiss; Lexington, "Potomak," Rafinesque, in Torr. Herb. (*H. foliosa.*) *North Carolina.*—Buncombe Co., Turkey Creek, near Morganton, Canby; Mts., Vasey, Croom; Bethany and Salem, Schweinitz. *Alabama.*—Buckley. *Louisiana.*—Red River, Hale. *Tennessee.*—Nashville, Gattinger. *Kentucky.*—Short. *Indiana.*—M. S. Coulter.

9. H. LONGIPETALA, Ser., in DC. Prodr. iv. 52, (1830).

Stems, 1° to 1½° high, usually bearing a few small bracts, slightly villous; petioles villous with rusty hairs; leaves broadly ovate-cordate, 2′ to 3′ broad, slightly 5 to 9-lobed, lobes aristate-dentate, margin finely ciliate; calyx at time of flowering about 2″ long, narrowly campanulate, glandular-pubescent, lobes half as long as entire calyx, unequal; petals linear, about twice as long as calyx lobes.

Mexico.—Regla, Halsted, (ex. descrip.); South Mexico, in Mountains above Toluca, (Andrieux, No. 356, fide Hemsley).

10. H. ORIZABENSIS, Hemsley, Diag. Pl. Nov. pars. iii. 50, (1880).

Villous with rusty spreading hairs, especially the 4′ to 8′ long petioles; stems 1° to 2° high, usually bearing one or two small leaves or laciniate bracts; lower leaves round-cordate, 2′ to 3′ broad, the larger veins villous underneath, the upper surface almost glabrous, slightly and rather obtusely 5 or 7-lobed, lobes crenate, aristate-dentate, margin ciliate; calyx at time of flowering campanulate, glandular-pubescent, about 2″ long; petals linear, about twice as long as calyx lobes; stamens conspicuously exserted.

Mexico.—Sierra de Agua, Müller, (ex descrip.). Peak of Orizaba, (Linden, No. 577, Galeotti, No. 2,835, fide Hemsley).

11. H. RUBESCENS, Torr. Sitgr. Rep., 160, (1854).

Stems, often bearing one or two small leaves or a few bracts, 1° to 18′ high, minutely glandular; petioles slightly villous, or sometimes almost glabrous; root-leaves round-cordate, sub-cordate or truncate, 1′ to 2′ broad, lobes indistinct, crenate-dentate; calyx at time of flowering rather narrowly campanulate, 2″ to 3″ long, minutely glandular at base, lobes somewhat tinged with red, pubescent; petals linear-spatulate, about twice as long as calyx lobes; stamens occasionally only slightly, but usually conspicuously, exserted.

Mexico.—San Luis Potosi, Schaffner, No. 71, (distrib. as *H. Mexicana*); Parry and Palmer, No. 231. *Texas.*—Chicos Mts., Havard, No. 39. *New Mexico.*—Wright, No. 1,097; Organ Mts., Vasey., Sitgreave's Exp. (type). *Arizona.*—Mt. Graham, Rothrock, No. 411; Mt. Agassiz, Rusby; Santa Rita Mts., Pringle. *Utah.*—Wahsatch Mts., Watson, No. 366; Parry, Nos. 12 and 61; Ogden, Hayden; Stansbury's Island, Stansbury's Exp; Kanab, Mrs. A. P. Thompson; near Great Salt Lake, Porter; Beaver City, Palmer, No. 149. *Nevada*—E. Humboldt Mts., Watson, No. 366. *California.*—Brewer, Nos. 1,759 and 2,101, Lemmon, No. 1,093, Greene, No. 413, Kellogg, Bolander, No. 4,935; Castle Lake, Pringle; Plumas Co., Mrs. Austin; San Bernadino Mts., Parish; Yosemite Valley and Mts., Torrey, No. 152, Bolander, No. 4,935. *Oregon.*—Stein's Mt., Cusick, No. 1,260.

Var. NANA, Gray, Pl. Wright, ii. 64, (1853).

Flowers smaller, stems 6′ to 10′ high.

Arizona.—"Rim Rock," Tonto Basin, Mearns, No. 138; Mexican Boundary Survey, Santa Rita del Cobra, Bigelow, No. 406a. *New Mexico*, Wright.

Var. OREGONENSIS, n. var.

Stems 8′ to 16′ high; calyx broadly campanulate and open, very variable in size, lobes short and obtuse, glandular to glandular-pubescent; styles shorter and more subulate; stamens and styles included at first, at length slightly exserted.

Oregon.—Stein's Mt.; Harney Valley; Siskiyou Mts., Thos. Howell, No. 689. A specimen collected by Mr. Parish on the San Bernadino Mts. in S. Calif., No. 1,820, seems to be an intermediate form, also one from Yosemite, Meehan.

*** Inflorescence glomerate-spicate, often secund.

12. H. BRACTEATA, (Torr.) Seringe in DC. Prodr., iv. 52, (1830).

Tiarella (?) *bracteata*, Torr. Ann. Lyc. N. Y., ii. 204, (1827).

Oreotrys bracteata, Raf. Fl. Tellur. ii. 74, (1836).

Small, stems usually several, 3′ to 8′ high, minutely glandular, naked or bearing two or three small leaves; root-leaves roundish, ½′ to 1½′ broad, subcordate, incisely lobed, lobes crenate-dentate; calyx at time of flowering campanulate, about 2″ long, minutely glandular; petals filiform, only a little longer than calyx lobes; stamens not exserted at first, but slightly exserted later.

Colorado.—Parry, No. 172, Greene; Georgetown, Patterson, No. 31; Denver to Idaho City, Porter; Rocky Mts., Hall and Harbour, No. 205, (in part); Grand Lake, Vasey, No. 217; James, (type of *Tiarella bracteata*); Gray's Peak. *Nevada.*—Empire City, Gray.

††† Flowering calyx 3″ to 5″ long.

* Inflorescence an open, spreading panicle.

13. H. PUBESCENS, Pursh, i. 187, (1814).

H. pulverulenta and *reniformis*, Raf. Med. Fl. i. 243 and 244, (1828).

H. ribifolia, Fisch. and Lall. in Ind. Sem. h. Petrop. 8, 62, (1841).

Stems, usually bearing one or two small leaves, 1° to 3° high, densely glandular, at least above; root-leaves round-cordate, 2′ to 4′ broad, slightly 5 or 7 lobed, veins prominent; calyx at time of flowering oblong-campanulate, somewhat oblique, 3″ to 4″ long, minutely glandular, lobes often unequal; petals broadly spatulate, veined, a little longer than calyx lobes; stamens hardly exserted, the anthers being on a level with the tips of the calyx lobes, sometimes, however, slightly exserted.

Pennsylvania.—Lancaster Co., Small; Birmingham, Miss Davis; near Schuylkill River, Canby; Banks of Susquehanna, Porter; Warriorsmark, Lowrie; Reading, Herb. Phil. Acad. *Maryland.*—Alleghanies, Rafinesque (*H. grandiflora*, Raf. in Herb. Torr.) *Virginia.*—Daubeny, Hot Springs, Curtiss. *North Carolina.*—Vasey; Hick. Nut Gap, Curtiss, Asheville, Thos. Hogg. *Kentucky.*—Rafinesque, (*H. reniformis*, Raf. in Herb. Gray); Bath, Short.

** Inflorescence a narrow panicle.

14. H. HISPIDA, Pursh, i. 188, (1814).

H. Richardsonii, R. Br., Frankl. Journ., 766, t. 29, (1823).

H. lucida, Schlecht., Ind. Sem. h. Hal. 8, (1848).

Stems, usually leafless, 2° to 4° high, hirsute, as are also the petioles, with pale spreading hairs, and above minutely glandular; leaves round-cordate to broadly ovate-cordate, 2′ to 3′ broad; calyx at time of flowering campanulate, conspicuously oblique, 3″ to 5″ long, lobes unequal; petals small, spatulate, a little longer than calyx lobes; stamens soon exserted, often becoming longer than the petals.

Virginia.—Gray. *Michigan.*—Kalamazoo, Tuthill. *Illinois.*—Babcock; Augusta, S. B. Mead; near Oquawka, Patterson; Ringwood, Vasey; Marion Co., Bebb; Winnebago Co., Bebb; Athens, E. Hall. *Wisconsin.*—Madison, S. H. Watson, Hale. *Iowa.*—Decorah, Collett. *Minnesota.*—Basswood Lake, Arthur, No. 431 (B.) *Dakota.*—Box Elder Creek, W. S. Rusby. *Montana*—Park Co., Tweedy, No. 259; Bozeman Pass, Canby, No. 116, (distrib. as *H. cylindrica*). *Idaho.*—Allen. *British America.*—Hooker; English River, Kennicott; Lake Superior, Macoun; Lake Winnepeg, (Dr. Gunn, in Herb. Torrey); Lake Winnepeg Valley, Bourgeau; Saskatchawan, Bourgeau; Assiniboia, Sourie Plains, Macoun, No. 733; Rocky Mts., Kananaskis, Macoun; Lake Shebandedwan, Ontario, Macoun.

Var. HIRSUTICAULIS, n. var.

Hirsute; stems for their entire length, as well as petioles and larger veins on lower surface of leaves, thickly beset with white or slightly yellowish spreading hairs; stems 1° to 2° high, naked, or bearing one or two very small leaves or laciniate bracts; root leaves round-cordate with a broad and deep sinus at base, 1′ to 3′ broad, with 5 or 7 obtuse lobes, lobes crenate-apiculate, margin ciliate, upper surface glaucous, or nearly so, lower surface pale; calyx at time of flowering campanulate, rather short and broad, about 2″ long, very slightly, if at all, oblique, minutely glandular, parted almost half way down, lobes somewhat unequal, obtuse, green, base of calyx often brownish; petals small, spatulate, green, looking like smaller calyx lobes, and like them minutely glandular, not projecting beyond calyx lobes; stamens much exserted; seeds numerous, about ¼″ long, dark brown, muricate, oblong, curved, triangular in section.

Missouri.—St. Louis, Engelmann; Louisiana, Pech.

This plant differs from *H. hispida* mainly in having an open, spreading panicle, and much smaller flowers. It may, perhaps, be a distinct species, but as there appear to be intermediate forms, it would seem best, for the present at least, to consider it a variety.

§ 2. Stamens always included.

† Flowering calyx 1″–2″ long.

‡ Flowering calyx campanulate.

* Inflorescence a long, narrow, racemose-panicle.

15. H. NOVA-MEXICANA, n. spec.

Stems 1° to 2° high, usually bearing a few small laciniate bracts, glandular-puberulent or pubescent, or even slightly villous, especially at the base and in the case of the younger stems, with short, scattered, pale, yellowish hairs; petioles 1′ to 3′ long, not slender, often grooved or fluted, villous with short yellowish hairs which are continued upon the larger veins on the lower surface of the leaves; leaves thin, sometimes purplish underneath when dried, 1′ to 2′ broad, round-cordate with a deep but usually rather narrow sinus at base, hardly lobed, crenate, mucronate-dentate, margin ciliate, upper surface glaucous, or that of the younger leaves pubescent; calyx at time of flowering short campanulate, broad, open, 1″ to 1½″ long, lobes short and obtuse, pulverulent, the base of the calyx, often chocolate-brown in color, becoming somewhat globose in fruit; petals minute, linear, not longer than calyx lobes; seeds numerous, about ¼″ long, muricate, oblong, almost straight. In one specimen examined (No. 1098 below) eight stamens were found, two of them arising from the same base.

New Mexico.—Wright, No. 1098; Copper mines, Bigelow, Mex. Bound. Survey, No. 407; Pinos Altos Mts., Greene.

** Inflorescence a short racemose-panicle.

16. H. HALLII, Gray, Proc. Acad. Phil. 62. (1863).

Glandular-puberulent; stems 4′ to 8′ high, naked, or bearing a few subulate bracts; leaves round-cordate or sub-cordate, ½′ to 1′ broad, slightly 5 lobed, lobes crenate-dentate; calyx at time of flowering 1½″ to 2″ long, minutely glandular or glandular-pubescent; petals narrowly spatulate with a long slender claw, almost twice as long as calyx lobes.

Colorado.—Georgetown, Jones, No. 499 (distrib. as *H. bracteata*); Grand Cañon of the Arkansas, Brandegee; Upper Arkansas, Porter; Pike's Peak, Sheldon, No. 319, Letterman, No. 27, Canby; Rocky Mts., Hall and Harbour, No. 205 (in part) (type); Greenhorn Mts., Greene. *Idaho.*—Ramshorn Mt., a glabrous form, Newberry.

‡‡ Flowering calyx almost rotate, limb flat, dilated.

17. H. PARVIFOLIA, Nutt., Torr. and Gray Fl., i., 581. (1840).

Glandular-puberulent; stems 6′ to 2° high, usually naked; leaves round-cordate, or occasionally reniform, ½′ to 2′ broad, crenately 5 or 7 lobed; calyx at time of flowering 1″ to 1½″ long, obconical, minutely glandular, lobes short, almost triangular; petals small, broadly spatulate or obovate with a very short claw, usually a little longer than calyx lobes.

New Mexico.—Fendler, No. 264; Santa Fe, Rothrock, No. 61; Santa Magdalena Mts., Vasey. *Arizona.*—Palmer. *Colorado.*—Wolf and Rothrock, Nos. 804 and 805, Parry, No. 173, Vasey, No. 218 and 219, Greene; Gray's Peak, Patterson, No. 32, Gray and Hooker; Lake City, Pease; Chian Cañon and Ute Pass, Porter; Georgetown, Jones, No. 452 (distrib. as *H. Hallii*); South Park, Coulter; Pike's Peak, Rocky Mts., Parry, Nos. 173 and 174, Thomas, Hall and Harbour, No. 204. *Utah.*—Ogden; Wahsatch Mts., Hayden, Watson, No. 368; Bear Valley, Palmer, No. 150. *Nevada.*—Shockley, No. 249. *Wyoming.*—Yellowstone Lake, Hayden; Laramie Plains, Sheldon, No. 88; Yellowstone Park, Tweedy, No. 246; Fort Bridger, Leidy, No. 61. *Oregon.*—Nuttall (type). *Montana.*—Shield's River, Scribner, No. 52a *British America.*—Cypress Hills, Macoun, No. 54; Milk River Ridge, N. W. T., Havard, Dawson, No. 732.

Alpine specimens of this species are smaller, with a shorter and more compact panicle.

†† Flowering calyx 2″–5″ long.

* Inflorescence a loose, few-flowered raceme.

18. H. RACEMOSA, Watson, Proc. Amer. Acad. xx. 365, (1885).

Glandular-pubescent; stems 4′ to 10′ high, bearing 2 or 3 comparatively large petiolate leaves; leaves reniform to reniform-cordate, crenately lobed and toothed, 1′ to 2′ broad, the younger leaves pubescent along the larger veins on the lower surface, and beset with short scattered hairs on the upper surface, in some plants the older leaves almost glabrous on both surfaces; calyx at time of flowering broadly campanulate, 2″ to 3″ long, glandular-puberulent or pubescent; petals linear-spatulate, occasionally more or less laciniately toothed toward the top, but little longer than calyx lobes.

Washington.—Mount Paddo (Adams) Suksdorf; Mts. north of Ellensburgh, Brandegee, No. 765; Cascade Mts., Brandegee, No. 305 (distributed as "*H. cylindrica*, small form").

19. H. WILLIAMSII, Eaton, Bot. Gazette, xv. 62, (1890).

Stems naked, slender, 1° to 2° high, glandular-puberulent; leaves 4 to 7, in a cluster at base of stem, round-cordate, 1′ to 1½′ broad, hardly lobed, crenate with a ciliate margin, glaucous, lower surface often somewhat purple in the dried specimens; petioles 1′ to 3′ long, slender; calyx at time of flowering obconical, acute at base, minutely glandular, 2″ to 3″ long, 1″ to 1½″ broad; petals caducous, broadly spatulate with a long slender claw, usually 2 to 3 times as long as calyx lobes, in some specimens even longer.

Montana.—R. S. Williams, No. 179 (type); near Jefferson City and Bozeman, Scribner, No. 52b; Nevada Creek, Canby, No. 119; Beaver Head Co., Tweedy, No. 39 (distributed as *Tellima pentandra*). *Wyoming.*—Yellowstone Park, Tweedy, No. 846, Chas. H. Hall.

** Inflorescence thyrsoid.

20. H. SANGUINEA, Engelm., in Wisliz. Rep. 23, (1848).

Stem slender, 1° to 18′ high, glandular-pubescent, naked, or bearing a few diminutive leaves; petioles 2′ to 4′ long, villous with soft, pale spreading hairs; root-leaves round-cordate, 1′ to 2′ broad, somewhat 5 or 7 lobed, lobes crenate-dentate, or almost serrate, margin ciliate; calyx at time of flowering red, campanulate, open, minutely glandular, about 4″ long; petals very short, less than 1″ long and inserted so low upon the calyx that their tips hardly project beyond the calyx-tube.

Mexico.—Chihuahua, Pringle, No. 1588. *New Mexico.*—Wright, No. 1096. *Arizona.*—South Catalina Mts., Pringle; Santa Rita Mts., Pringle; Sanoita Valley, Rothrock, No. 673; Camp Lowell, Parish, No. 86.

*** Inflorescence more or less spicate.

21. H. CYLINDRICA, Dougl., Hook. Fl. Bor. Am. i., 236, (1840).

Stem naked, 2° to 3° high, lower portion as well as petioles and larger veins on lower surface of leaves very villous or hirsute with spreading rusty hairs; petioles rather slender, 4′ to 1° long; leaves 1′ to 3′ broad, round-cordate, almost glabrous above, slightly 5 or 7 lobed, lobes obtuse, crenate, mucronate-dentate; calyx at time of flowering 3″ to 4″ long, campanulate, glandular and scabrous, somewhat oblique, deeply cleft; petals minute or none.

Oregon.—Nuttall, Elihu Hall, No. 160, "Hooker, dupl."

Herb. Gray; Clear Water, Spaulding; Portland, Howell; Cascade Mts., Newberry; Sumass Prairie, Lyall, Oregon Bound Commiss.; Columbia Woods, Nuttall, "*Holochloa elata.*" *Washington.*—Upper Columbia, U. S. Expl. Exp., No. 461; Falcon Valley, Suksdorf. *British Columbia.*—Fletcher. Vancouver's Island, Macoun.

Var. OVALIFOLIA (Nutt.)

H. ovalifolia, Nutt., in T. & G. Fl. i. 581, (1840).

Minutely glandular-pubescent; stems 8′ to 18′ high, naked, or bearing a few subulate bracts; leaves minutely viscid-pubescent on both sides, or occasionally almost glabrous, ½′ to 1½′ long, oval or roundish oval, usually truncate or even somewhat cuneiform at base, but occasionally slightly cordate, crenate or crenately incised, occasionally slightly lobed; calyx at time of flowering campanulate, pubescent, 3″ to 4″ long, lobes somewhat unequal; petals often wanting.

Nevada.—East Humboldt Mts., Jones. *Wyoming.*—Stinking Water, Parry, No. 99; Yellowstone Park, Tweedy, Platt, Hayden Survey (distrib. as *H. cylindrica*). *Idaho.*—Hayden's Exped. *Oregon.*—Blue Mts., Nuttall (type); Union Co., Cusick (a very large flowered form, calyx almost 6″ long). *Montana.*—Bannock, Watson, No. 137; Rocky Mts., S. of Va. City, Hayden. *Washington.*—North Fork Columbia River and Interior, U. S. Explor. Exped. *British America.*—Crow's Nest Pass, and near Kamloops, Dawson; Spencer's Bridge and Morley, Macoun.

Var. ALPINA, Watson, King's Rep., v. 96, (1871).

Glandular-pubescent; stem 6′ to 12′ high; leaves ¾′ to 1′ broad; spikes short, hardly more than 1′ long.

Nevada.—Clover Mts., Watson, No. 367 (type). *Oregon.*—Howell, R. D. Nevius. *Washington.*—Mt. Adams, Suksdorf, Nos. 14 and 26. *British Columbia.*—Kananaskis, Rocky Mts., Macoun; Crow's Nest Pass, Rocky Mts., Dawson.

Var. GLABELLA (Torr. & Gray);

H. glabella, Torr. & Gray, Fl. i. 581, (1840).

Almost glabrous, or slightly pulverulent-pubescent, destitute of spreading hairs; stem naked, 18′ to 2° high; leaves round-cordate to ovate-cordate, often thick and leathery, 1′ to 2′ broad, crenately lobed, veins prominent, lobes crenate, apiculate-dentate; calyx at time of flowering 3″ to 4″ long, campanulate, glandular-pubescent; petals minute or wanting.

Montana.—Judith Mts., Canby; Rattlesnake Canon, Watson, No. 137; Little Belt Mts., Scribner, No. 52; *Oregon.*—Nuttall, (type), Lt. Mullan; Blue Mts., Henderson. *Washington.*—Spokane Co., Suksdorf, No. 299; Cascade Mts., Yakima, Brandegee. *British America.*—Kootanie Pass, Rocky Mts., Dawson.

Var. TENUIFOLIA, n. var.

Glabrous, stem naked, 1° to 2° high; leaves thin, round-cordate, 1′ to 2′ broad, somewhat incisely 5 or 7 lobed, lobes crenate, aristate-dentate, margin minutely ciliate; petioles slender, 2′ to 4′ long; calyx at time of flowering 2″ to 3″ long, campanulate, open, minutely glandular, deeply cleft into somewhat unequal lobes; petals narrowly spatulate, becoming as long, or nearly as long, as the calyx lobes.

Oregon.—Near the Dalles, Thos. Howell (distrib. as *H. glabella*, Nutt.). *Washington.*—Sincoe Mts., J. Howell.

In addition to the specimens contained in the Columbia College Herbarium, those of Harvard College, the Academy of Natural Sciences of Philadelphia, the National Herbarium at Washington, the Geological Survey of Canada, Mr. Wm. M. Canby and Prof. Thos. C. Porter have been examined.

A Biographical Sketch of Dr. George Thurber.

By H. H. Rusby.

George Thurber was born in Providence, R. I., on September 2d, 1821, his father being Jacob Thurber, for many years a well-known business man of that city. Although Dr. Thurber was in the strict sense of the word a self-educated man, his chief studies lying in the direction of subjects in which he was specially interested, and being pursued by methods of his own devising, yet he enjoyed for some time the advantages of study at the Union Classical and Engineering School of Providence, conducted by Mr. Thomas C. Hartshorn. Among his schoolmates were several men who have since become distinguished, the most noted of them, perhaps, being Mr. George William Curtis. He never graduated from this institution. By his strong disposition to utilize the results of study in some practical manner, he was soon led to become interested in the subject of pharmacy, and was duly apprenticed to a pharmacist of his native city. During this appreticeship his taste for chemistry was cultivated to such an extent that when he became himself a proprietor, in partnership with Mr. Joshua Chapin, he pursued the study as a specialty, and fitted himself for special work in that department. About this time he was appointed lecturer on chemistry at the Franklin Society of Providence, the position being purely an honorary one. In 1840 the members of his class presented him with a testimonial in the form of a copy of Turner's Chemistry, the volume being still in the possession of his relatives. His peculiar passion for tracing everything to its origin soon forced him into the study of botany as explaining the sources of the vegetable drugs with whose composition he had already become so familiar. Once introduced to this science, his love for it rapidly grew into an absorbing passion, and he developed an intense desire to make botanical explorations. He therefore eagerly seized an opportunity which presented itself in 1850 for becoming associated with the United States Boundary Commission to settle the boundary between the United States and Mexico, his position being that of botanist, to which were added, after the fashion of the times, the offices of quartermaster and commissary. The duties of this position occupied him for nearly four years, when the commission was disbanded and he returned to his home in Providence. His duties while on this commission were performed in no perfunctory manner. Thoroughly in love with the work which his position brought to him, he secured a collection which will ever be historical, and which formed the subject of Dr. Gray's important contribution, "*Plantæ Novæ Thurberianæ.*" It was upon this expedition that Dr. Thurber discovered the curious *Pilostyles*, which he at once recognized as something very curious, and which he subsequently accurately classified, insisting upon his determination in the face of the persistent incredulity of both Torrey and Gray, until his earnestness led them to an investigation and confirmation. Almost immediately after his return to Providence he was made a member of the Visiting Board of Brown University on Applied Chemistry, and from that institution he subsequently received the degree of A. M. In the year of his return he received, chiefly, I believe, through the influence of Dr. Torrey, an appointment to the United States Assay Office in New York. His letter of acceptance was written on Christmas day. The thoroughness with which Dr. Thurber assimilated and the persistence with which he retained information is evidenced by the fact that a careful perusal of his diary, written subsequent to his return from Mexico, appears to establish the fact that he did not find it necessary to review his previous knowledge of chemistry in order to fit himself for assuming this important position. He remained in the Assay Office until 1856, when he resigned on account of political differences, this incident well illustrating his perfect candor and uncompromising spirit. Upon being asked for a contribution to the campaign fund of the dominant political party, he, being an enthusiastic admirer of the opposition candidate, inquired, "Is this an invitation or a demand?" He was informed that it was a demand, and at once tendered his resignation. He then established some sort of a connection with the Cooper Union, as a lecturer according to one authority, and according to another as a tenant and student. The former statement is probably the correct one. At about the same time he accepted a position as lecturer on botany and materia medica at the College of Pharmacy of the City of New York, resigning after several terms to occupy the chair of botany and horticulture in the Michigan Agricultural College. Four years later he returned to New York and again lectured for a short time in the College of Pharmacy. He then became editor of the *American Agriculturist*, devoting twenty-two years, the most of the remaining active portion of his life, to this work, which he conducted successfully from every point of view. He established his home at a beautiful point upon the left bank of the Passaic River, near the village of Passaic, which he named "The Pines" after a little grove of large pine trees growing in front of his house. In 1880 he paid a brief visit to Europe, visiting England, France, Belgium, Germany and Switzerland, where he was treated with distinguished consideration by many leading botanists and horticulturists. He always counted among his pleasantest privileges that of being able to return a portion of this pleasant hospitality some years later when he received Sir Joseph Hooker, who accompanied Dr. Gray on a tour through the great West. In 1886 he was made a corresponding member of the

Royal Horticultural Society of London. He was a life member of the American Pomological Society, and presided over its Atlanta meeting. He was also President of the New Jersey Horticultural Society, a corresponding member of the Philadelphia Academy of Sciences, and an active member of the New York Academy of Sciences. From the University Medical College of New York he received the honorary title of Doctor of Medicine.

Two genera of plants have been dedicated to this distinguished man. On page 209 of the first volume of Bentham & Hooker we find accepted the genus *Thurberia*, of Asa Gray, in the *Memoirs of the American Academy*, v. 308. But on page 982 of the same volume the authors announce their opinion that this recognition was erroneous, as the genus *Thurberia* of Gray is not to be separated from *Gossypium*. Mr. Bentham therefore, in the *Journal of the Linnæan Society*, xix, 58, dedicates to him a genus comprising two species of grasses of Texas and Arkansas, and this genus is accredited in the third volume, page 1,118, of the *Genera Plantarum*. We have, therefore, the curious circumstance of having the same name applied to two different genera in different volumes of the same work. This reference is thus given in detail because of an erroneous idea which has been created by the statement in *Garden and Forest*, April 9, page 173, where Gray's genus *Thurberia* is referred to as though it were the accepted one.

It was probably owing to the indefatigable exertions and accompanying exposures of his Mexican service that Dr. Thurber contracted a rheumatism to which he was ever after a martyr. It was painful to witness his frequent attacks, during which he remained steadily at his desk, performing his duties day and night in the midst of the acutest torture. But during the last few years various complications developed which almost incapacitated him for any severe labor, and to these he succumbed on the night of Wednesday, April 2, leaving a brother and three sisters, together with a host of professional and personal friends, to mourn his loss. He was buried in the Swan Point Cemetery, founded, strangely enough, by the same Thomas C. Hartshorn who had instructed him when a boy, and overlooking the beautiful valley of the Seekonk River where in early life he had found his favorite haunts for botanizing.

As a man, Dr. Thurber was frank, truthful and conscientious in all his relations, kind and generous beyond most men, sensitive and sympathetic. Possessed of a perfect physical and moral courage, and of a fortitude ample to second those qualities, he never wavered in the performance of any one of the diversified duties which fell to his lot. Like his warm personal friend Dr. Gray, he was noted for his readiness to turn from his absorbing labors and spare a portion of his limited time for the assistance and instruction of the young; but almost the last thing he would do was to ask any assistance from anyone else or subject them to the slightest inconvenience. At the same time that he was thus genial and considerate of the young, his air had nothing of the patronizing style about it, and he was equally considerate to those who approached him as his equals.

A considerable portion of his time and effort were devoted to the exposure of business and professional frauds, in the humbug column of the *American Agriculturist*, which thus became a terror to quacks, charlatans and swindlers of every description, but particularly to those circulating among the agricultural community, where his influence was widest and strongest. Under his control the advertising columns of this journal were absolutely incorruptible, and unapproachable by any but the most worthy of subjects. Although constantly tempted by the most alluring offers, both for himself and for his publishers, those columns were never known to be opened to any patent medicine or other questionable or evil article ; and in thus commenting upon his character, we cannot fail to be impressed with the very unusual spectacle of a large publishing house supporting its editor in refusing, solely from motives of principle, this very lucrative class of patronage. Dr. Thurber carried his discountenancing of secrecy to a point which must appear amusing to any but the most well informed intelligence. He would touch no medicine of any kind unless he was fully informed as to its composition and character, and even in matters of eating and drinking he insisted upon the most perfect knowledge of the nature of the articles. It is even humorously reported that he could not enjoy his green peas unless he knew the name of their variety.

He was one of the hardest workers that his profession has ever known in this country, and his irregular habits of working and resting unquestionably did much to aggravate his malady and shorten his life. Not infrequently would his labor continue through the night, the hours uncounted, until his family rising, perhaps late on a Sunday morning, would find him still engaged at his writing, the rays of his lamp mingling unnoticed with those of the rising sun. During his attacks of sickness he was accustomed to have his couch drawn beside his desk, where he would sit until, exhausted by suffering and exertion, he would recline until sufficiently rested to resume his writing.

Immediately adjoining his house was his experimental garden, which was very extensive, and to the careful and continuous use of which is largely to be accredited the singular accuracy of detail and realism, and the naturalness of style, which characterize his horticultural contributions.

Unfortunately Dr. Thurber wrote but few articles over his own signature. His chief contributions were to the *American Agriculturist*, in the form of "The Doctor's Talks" and "Notes from the Pines." The latter papers were conspicuous in horticultural literature for the extent and accuracy of the botanical information which they covered. During his residence in Michigan he revised and partially rewrote *Darlington's Agricultural Botany*, which was then published under the title of *American Weeds and Useful Plants*. He wrote also the graminology of the botany of California, and the entire botany of *Appleton's New American Encyclopædia*, which latter, when he assumed charge of it, was said to be in a fair way to inflict a vast accumulation of errors upon the American public. In addition to this accredited work Dr. Thurber made important contributions to science in connection with his oversight of the publications of the Orange Judd Co., as much by the elimination of erroneous matter as by actual additions.

As a botanist Dr. Thurber was keen of discrimination, patient and thorough in research, of retentive memory and possessed of a sound judgment. Yet in all of these qualities, which made him honored among botanists, he was excelled by his rare ability for instructing in botanical subjects those who possessed little or no knowledge of the science. His clearness of diction, his pleasing style and his ready adaptability to the character of his readers did much to popularize the science, and especially to induce those practically interested in gardening and horticulture to inform themselves more fully of the science on which their art depended. *Garden and Forest*, in a notice of Dr. Thurber, expresses the opinion that his writings did more in his time to elevate the standing of the agricultural and horticultural press of the country than the writings of any other man. Graminology was his well known specialty and there were few, either in this country or abroad, who were his equals. The regret must be universal that he did not live to complete his monograph upon American Grasses. His last paper, upon the poisonous hairs of *Primula obconica*, published in *Garden and Forest*, was one in the writing of which he took the greatest interest and to which he devoted all the enthusiasm of his by-gone youth.

To the members of the Torrey Botanical Club Dr. Thurber was best known as the long-time President of our Association. In March, 1873, he wrote the obituary notice of his warm and life-long friend, Dr. Torrey, at that time the President of the Club, and the following month he acted as Chairman of a committee, in association with Mr. Leggett and Mr. Hall, in drafting formal resolutions concerning the death of this gentleman. On the 29th of April, 1873, he was elected as Dr. Torrey's successor, our present associate, Dr. T. F. Allen, serving with him as Vice-President. This position he occupied for a long series of years—as long as he was able to give attention to the proceedings of the association or to be present at its meetings. In 1880 he was succeeded in the Presidency by Dr. Newberry.

Dr. Thurber was accustomed to saving every letter which he received, however unimportant the subject, so that there is material for greatly extending this brief notice.

His library and collections were left for the benefit of his nephew, Harry Woolson. The bulk of his collections will probably be deposited in the Harvard herbarium.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XIII.

(Continued from page 94.)

Rami graciles, fuscescentes. Petiolus 3-6 cm. longus. Folia tenuiter membranacea, in eadom jugo satis inæqualia, majora 13-18 cm. longa, 6-10 cm. lata. Cymæ 1-2 cm. longæ. Calycis tubus 4 mm. longus; dentes exteriores erecti, 4-5 mm. longi. Baccæ subglobosæ, circiter 1 cm. crassæ. Aff. *Cl. hirta*. Mapiri, 2,500 ft. (2238).

CLIDEMIA CORDATA, Cogn. sp. nov. (Sect. *Sagræa*, Cogn.); fere glaberrima; ramis teretibus, superne leviter compressis, junioribus vix furfuraceis; foliis longe petiolatis, late ovato-cordatis, acutiuscule beviterque acuminatis, minute crenulato-denticulatis, 7-9-nerviis, subtus ad nervos leviter furfuraceis; cymis brevibus, diffusis, paucifloris; floribus 4-meris, brevissime pedicellatis, basi minutissime bibracteolatis; calycis tubo ovoideo, lobis brevissimis, dentibus exterioribus oblongo-linearibus, obtusiusculis, tubo paulo brevioribus.

Rami satis graciles, elongati, fuscescentes. Petiolus 6-10 cm. longus. Folia tenuiter membranacea, 11-16 cm. longa, 9-13 cm. lata. Cymæ 3-5 cm. longæ; pedicelli 1-3 mm. longi. Calycis tubus 2 mm. longus; dentes reflexi, 1½-2 mm. longi. Mapiri, 2,500 ft. (2311).

CLIDEMIA RUSBYI, Britt. spec. nova. Sect. *Sagræa*. Frutex erectus, ramosus; flores in axillis foliorum sessiles congesti; foliis glabris, 5-nerviis, oblongis, acuminatis, basi acutis, 7-9 cm. longis, 3-4 cm. latis; petiolis 1-2 cm. longis; rami tereti; calycis tubus furfuraceis, dentes tubo multo breviores. Mapiri, 2,500 ft. (2320). Nearest *Clidemia septuplinervia*, Cogn. ex descriptio.

CLIDEMIA PILOSISSIMA, Britt. spec. nova. Frutex adscendens, ramosus; flores in paniculas axillares digesti; folia 7-nervia, cordata, acuminata vel acuta, 10-15 cm. longa, 5-8 cm. lata, utrinque stellato-pubescentia, membranacea, longe petiolata; petiolis marginis venisve longe rufo-pilosis; pedicellis longiusculis, crassis, rufo pilosis, stellato-pubescentibus; fructus globosus, 6 mm. longus. Mapiri, 5,000 ft. (2234). Related to *S. umbrosa*.

CLIDEMIA OBLIQUA, Griseb. Mapiri 2,500 ft. (2317).

Calophysa pilosa, (Don.), Tri. l. c. Mapiri, 5,000 ft. (2315).

Microphysa quadrialata, Naud. l. c. 99.? Falls of the Madeira, (2241).

Bellucia grossularioides, (L.), Tri. l. c. 141. Guanai, 2,000 ft. (2314).

Bellucia imperialis, Sald. and Cogn. in Mart. Fl. Bras. xiv. (4), 515? Mapiri, 5,000 ft. (2330).

Ossæa petiolaris, (Naud.), Tri. l. c. 147. Mapiri, 5,000 ft. (2301; 2310).

Blakea repens, (R. & P.), Don. l. c. 325. Guanai, 2,000 ft. (2342).

Mourinia parvifolia, Benth. in Voy. Sulphur, 97. Mapiri, 5,000 ft. (2681).

Mourinia princeps, Naud. l. c. xviii. 283. Junction of the rivers Beni and Madre de Dios, (2666).

Mourinia? Same locality. (2682).

I am indebted to M. Cogniaux of Verviers, Belgium, the distinguished monographer of this difficult order for the Brazil Flora and DeCandolle's "Monographiæ Phanerogamorum," for many notes and determinations.

LYTHRARIEÆ.

Adenaria floribunda, H. B. K. Nov. Gen. vi. 188. Sorata, 8,000 ft. (1419).

Var. *grisleoides*, (H. B. K.), Kœhne in Mart. Fl. Bras. xiii. (2), 210. Guanui, 2,000 ft. (1966).

Cuphea micrantha, H. B. K. loc. cit. 196. Guanai, 2,000 ft. (1858).

Cuphea Spruceana, Kœhne. Mapiri, 5,000 ft. (1924).

Cuphea verticillata, H. B. K. loc. cit. Sorata, 8,000 ft. (1070).

Cuphea ianthina, Kœhne. Yungas, 4,000 ft. (1068); Sorata, 10,000 ft. (1067); 8,000 ft. (1066); Unduavi, 8,000 ft. (1064); near La Paz, 10,000 ft. (1065). Also a form with narrower leaves from Unduavi, 8,000 ft. (1069).

Physocalymna scaberrimum, Pohl, Flora, 1827, 153. (*P. floridum*, Pohl, Pl. Bras. i. 100). Junction of the Rivers Beni and Madre de Dios (2444).

Punica Granatum, L. Sp. Pl. 427. Tacna, Chili. Cultivated. (464).

ONAGRARIEÆ.

Epilobium andicolum, Haussk. Œst. Bot. Zeit. 1879. Near La Paz, 10,000 ft. (1805); Yungas, 6,000 ft. (1807); Unduavi, 8,000 ft. (1808). The same as Mandon's No. 626.

Epilobium denticulatum, R. & P. Fl. Per. iii. 78. Near La Paz, 10,000 ft. (1806).

Epilobium, a single incomplete specimen from Valparaiso, Chili (2510).

Jussiæa Peruviana, L. Sp. Pl. 555. Mapiri, 2,500 ft. (1794).

Jussiæa latifolia, Benth. in Hook. Journ. Bot. ii. 317. Falls of the Madeira, Brazil (1796).

Jussiæa nervosa, Poir. in Lam. Encycl. Suppl. iii. 199. Guanai, 2,000 ft. (1799).

Jussiæa nervosa, Poir. var. *pubescens*, Mich. in Mart. Fl. Bras. xiii. (II), 155. Guanai, 2,000 ft. (1221). A broad-leaved form, possibly a distinct species.

Jussiæa densiflora, Mich. Flora, 1874, 300. Beni River, Bolivia (1235); Falls of the Madeira, Brazil, (1792).

Jussiæa erecta, L. Sp. Pl. 556. Guanai, 2,000 ft. (1095).

Jussiæa affinis, DC. Prodr. iii. 53. Reis, Bolivia (1793); Falls of the Madeira, Brazil (1795).

Jussiæa octonervia, Lam. Dict. iii. 332. Beni River, Bolivia (1798); Falls of the Madeira, Brazil (1797).

ŒNOTHERA COCCINEA, spec. nova. Caulis basi sublignosus, simplex, ½ met. altus, pubescens, pilis brevioribus; folia alterna, sessilia, lanceolata 5–8 cm. longa, 8–20 mm. lata, remote denticulata, utrinque parce pilosa vel glabrata; flores axillares, solitarii, sessiles, coccinei, 2 cm. lat.; petala ovata, obtusa, integra; capsula cylindrico-ovoidea, hirsuta, 15 mm. longa, 4 mm. lata; semina numerosa, oblonga, compressa, ¼ mm. longa.

Ingenio del Oro, 10,000 ft. (1815; 1976). A very showy species, related to *O. mollissima*, L.

Œnothera rosea, Ait. Hort. Kew. ii. 3. Sorata, 8,000 ft. (1814).

Fuchsia rosea, R. & P. Fl. Per. iii. 89. Near Valparaiso (1800; 1852). Named by Dr. Philippi.

Fuchsia serratifolia, R. &. P. l. c. 86. Yungas, 6,000 ft. (1801).

Fuchsia dependens, Hook. Ic. Pl. t. 65. Yungas (1071; 1802); Unduavi (1804).

Fuchsia Magellanica, Lam. Yungas, 4,000 ft. (1812).

FUCHSIA BOLIVIANA, Britt. spec. nova. Arbor vel frutex glabra. Folia opposita, petiolata, membranacea, ovalia, 6 cm.-12 cm. longa, 3cm.-4cm. lata, utrinque acuta, minute serrulata, petiolis 1 cm. longis. Flores rosei, 2 cm.-3cm. longi, gracile pedicellati, in paniculas foliosas terminales dispositi; calycis tubus tubulosus, lobi lineares, acuti, tubo breviores; petala calycis lobis similia, paulo breviora; stamina petalis paulo breviora; ovarium oblongum; stylo paulo exserto.

Yungas, 6,000 ft. (1813). The same as Mandon's No. 624, Herb. Kew. Related to the Mexican *F. arborescens*, Sims.

F. salicifolia, Hemsl. Unduavi, 8,000 ft. (1803).

Fuchsia, a fragment of a species near *F. ampliata*, Benth., but corolla tube more slender and leaves acuminate. Probably undescribed.

SAMYDACEÆ.

Casearia Javitensis, H.B.K. Nov. Gen. v. 366. Falls of the Madeira, Brazil (2415).

Casearia spinosa, Willd. Sp. Pl. ii. 626. Junction of the Rivers Beni and Madre de Dios (1382).

Casearia sylvestris, Sw. Fl. Ind. Occ. ii. 752. Reis, 1,500 ft. (1383).

Casearia punctata, Spr. Neue Entd. ii. 154. Guanai, 2,000 ft. (r384). The same as Lechler's No. 2514 from Peru, Herb. Kew.

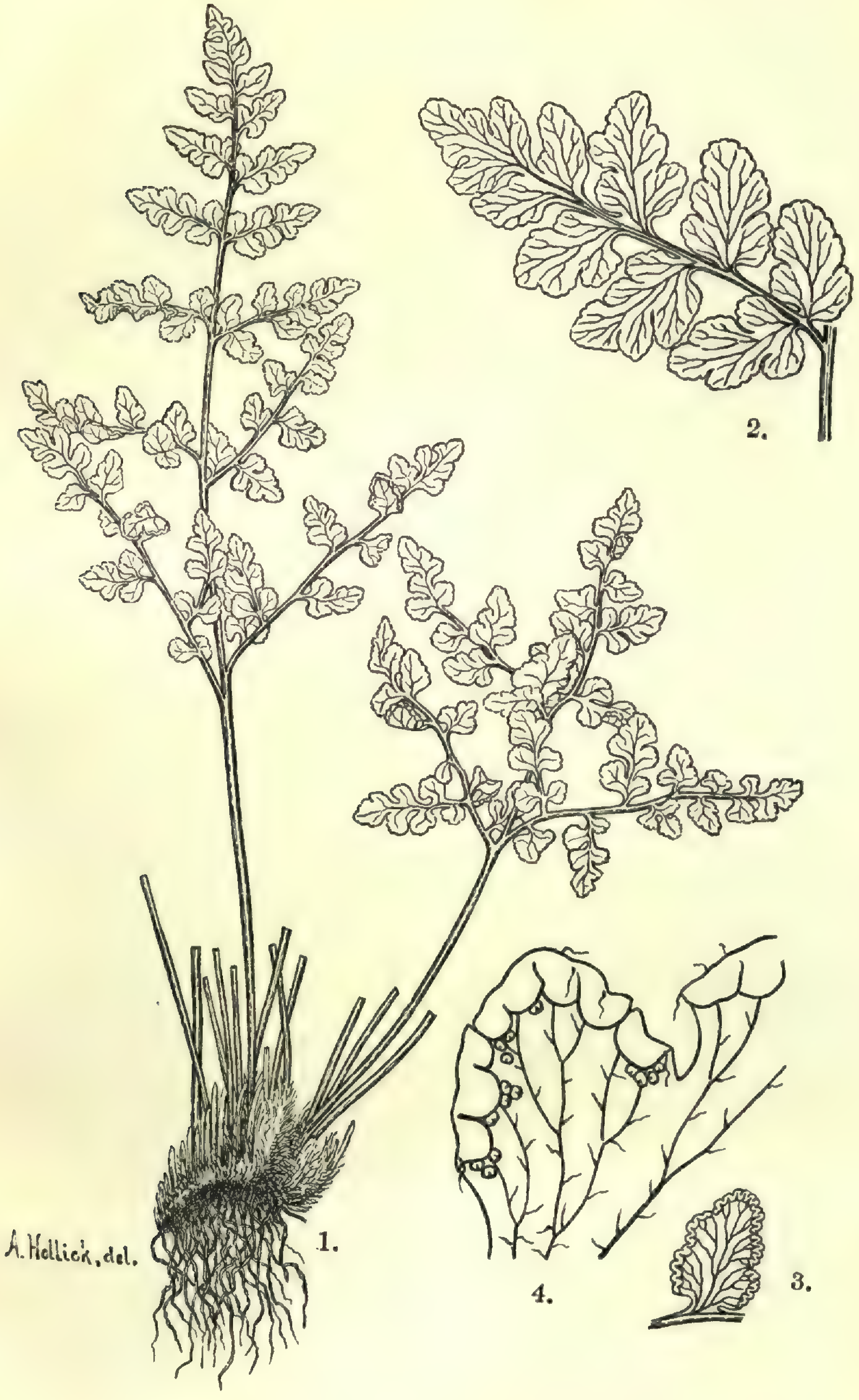
Casearia oblongifolia, Camb. in St. Hil. Fl. Bras. Merid. Guanai, 2,000 ft. (1974), also 1977 from same locality, also 2494, collected in fruit, all doubtfully referred to this species.

Casearia bracteifera, Sagot in Herb. Kew.? Falls of the Madeira, Brazil (2574).

CASEARIA MEMBRANACEA, spec. nova. Arbor inermis, ramulis cinereis. Folia ovalia, tenuiter membranacea, utrinque acuta, 9-13 cm. longa, 3-5 cm. lata, minute serrulata, glabra, petiolata, punctata. Flores in fasciculas numerosa; calycis peddunculisque pubescentibus, staminibus 10. Junction of the Rivers Beni and Madre de Dios (2074).

Casearia, species collected in fruit. Falls of Madeira (2614 a).

ABATIA BOLIVIANA (Mandon & Wedd.). (*Graniera Boliviana*, Mandon & Wedd. Pl. And. Boliv. No. 1511). Sorata, 10,000 ft (2468).



Cheilanthes Brandegei, D. C. Eaton.

A New Fern.

(Plate CIV).

CHEILANTHES BRANDEGEI:—Caudice brevi adscendente; stipitibus cæspitosis fragilibus castaneis ad basim paleis brunneis lanceolatis vestitis; frondibus membranaceis deltoideo-ovatis 3-6 uncialibus bi-tripinnatis viridibus supra fere laevibus infra secus venulas exigue pilosis; pinnulis ovatis obtusis nunc amplis nunc minoribus crenatis vel majoribus crenato incisis, basi plerumque rachi decurrenti-adnatis, venulis conspicuis dichotomis; involucris interruptis nunc sub-confluentibus viridibus margine scarioso parce ciliatis.

Magdalena Island and San Benito, in Lower California, collected in January, March and April, 1889, by Mr. Townsend Stith Brandegee of San Francisco.

This plant has in habit and the shape of the pinnæ and segments, some resemblance to *Pellæa Seemanni*, Hooker, and in giving Mr. Brandegee the names of the ferns he collected in his visit to Lower California I referred it with some doubt to that species. But the interrupted involucres are plainly those of *Cheilanthes*. The fern should be placed in § *Adiantopsis*, but there is no species to which it is very closely related.

The drawing by Mr. Arthur Hollick represents a plant gathered in January and a part of a frond gathered a few months later, when the pinnæ were more fully expanded.

D. C. EATON.

DESCRIPTION OF THE PLATE.

Fig. 1.—A plant, natural size.
2.—A pinna, enlarged.
3.—A fruiting segment, enlarged.
4.—Part of same, magnified.

A New Fern for North America.

ASPLENIUM FONTANUM (L.), BERNH. (*Asplenium Halleri*, R. Brown.) Many years ago the late J. M. McMinn, then residing at Williamsport, sent me a package of plants, and amongst them I found an unnamed fern, whose label states that it was collected by him "on a dry, rocky cliff, on Lycoming Creek, Lycoming County, Penn., July, 1869." At the time, I feared a foreigner had inadvertently been put in the place of something else, and hence gave it no further consideration, although, afterwards, the collector assured a botanical friend that I was mistaken in my judgment. I now believe that the suspicion was wholly groundless, and this belief is confirmed by the discovery, in my herbarium, of another unnamed specimen of the very same fern, collected by Mrs. E. J. Spence, near Springfield, Ohio, and sent me by Dr. Beardslee, of Painesville, in 1871, as one of the plants of the State.

The specimens agree closely with *Asplenium Halleri*, of Europe, except that the mucronate-spinulose tips of the divisions of the pinnæ are somewhat longer.

Against its admission into our flora no good reason can be urged on the score of improbability, for its congeners and near allies, the little rock-ferns of the old world, *A. Trichomanes*, *A. viride* and *A. Ruta-muraria*, occur here also. Because of common resemblance, as well as its small size and rarity, it has, perhaps, been often overlooked. Sought for, with intent to find, it will no doubt yet be detected at other points in our territory, and a full supply obtained.

In this connection I may mention that *Asplenium Bradleyi*, D. C. Eaton, has recently been discovered in Lancaster County, Penn., by Mr. John K. Small--a remarkable extension of its range to the north and east. But, when it is known that the same enthusiastic young botanist has also discovered in the same region a considerable number of stations for its usual associates, *A. montanum* and *A. pinnatifidum*, it need awaken no surprise.

THOS. C. PORTER.

Botanical Notes.

Contributions from the National Herbarium. Under the above title an important serial publication has been begun by the Division of Botany of the U. S. Department of Agriculture. It is designed to afford a place for the presentation of the valuable results now being obtained by the botanists of the Department and others who may be especially employed to study the large collections made by the special agents now in the field in various parts of the country. Two numbers have already been printed. The first contains an account of Dr. Edward Palmer's collections in the Southwest by Dr. Vasey and Mr. Rose; the second an enumeration of Mr. G. C. Nealley's collections during the past three years in southwestern Texas by Dr. Coulter.

Reviews of Foreign Literature.

Della presenza di Stipole nella Lonicera cærulea. Nota di S. Sommier, (Nuovo Gior. Bot. Italiano, April, '90).

In this article the author describes a form of *Lonicera*, called by him *L. cærulea*, *L.* forma *stipuligera* which he collected in Western Siberia, and which in his specimens unite the forms of the species heretofore known as *α glabrescens*, Rupr., *β villosa*, Torrey and Gray, and *γ edulis*, Turcz., with elliptical, ovate or obovate leaves varying as to size, and both villous or glabrous, most of the specimens having well developed interpetiolar stipules. When young they are merely foliaceous expansions that unite the two opposing petioles, making a more or less circular disk. This disk, called by Sig. Sommier "stipular disk" was in some plants slightly developed, in others attaining nearly 11 mm., and when young is of the same color, consistency, etc., as the leaves; later they turn the color of the woody stem, and are persistent after the fall of the leaves.

These stipules bear a strong resemblance to those of *Pentapyxis stipulata* and *Lycesteria glaucophylla*, especially to those of the latter plant, which is described in the Flora of British India as having stipules "entirely absent or more or less developed into a small semi-circular coriaceous lamina." In *Lonicera Californica*, Torr. and Gray, the superior leaves are connate like those of *Lonicera Caprifolium*, the lower ones having detached appendages (called stipuliform appendages in the Flora of North America) that correspond as perfectly to the disk of *L. cærulea* as to the appendages called stipules by Hooker and Thomson in *Pentapyxis*. In *L. Californica* it is hard to say whether the stipuliform appendages attaching themselves to the bases of the upper leaves, form the perfoliate disk or whether the connate leaves lobed at their bases are the origin of the stipuliform appendages.

Sig. Sommier suggests that, as there is an ever increasing number of species, genera and orders, formerly thought exstipulate, in which stipules, either rudimentary or in a single stage of the development of the plant, are being found, this might be an argument in favor of the hypothesis that stipules like leaf-sheaths are the remains of primitive foliaceous appendages from which originated the monocotyledons and dicotyledons, (Saporta et Marion, L'Evolution du Règne Végétal) and he concludes with the following deductions:

1st. That this species is a link between the sections Caprifolium and Xylosteum, that is between the perfoliate and imperfoliate *Lonicerœ.*

2d. That the presence of stipules in the genus *Pentapyxis* will nullify the characters that absolutely distinguish this genus from *Lonicera*, (*L. Californica* furnishing another example of a stipulate species).

3d. That stipules in the order Caprifoliaceæ do not have that taxinomical value heretofore attributed to them, as in the same species, or even in the same individual they may be more or less developed or are absent altogether.

4th. That the presence of stipules in the Rubiaceæ loses some of its value as a distinguishing character between that order and the Caprifoliaceæ.

A. M. V.

Index to Recent American Botanical Literature.

Araucarioxylon of Kraus, with Compiled Descriptions and Partial Synonomy of the Species—A Revision of the Genus. F. H. Knowlton. (Proc. U. S. Nat. Mus. xii. 601-617).

In this contribution an attempt is made to arrange the various fossil genera *Araucarites, Dadoxylon, Pissadendron, Cordaites,* etc., according to their supposed affinities, and to give a complete synonomy and bibliography of each species. In this arrangement three genera only are recognized, *Cordaites*, Unger, *Dadoxylon*, Endl., and *Araucarioxylon*, Kraus. Eleven species are included under the first mentioned genus, twenty-six under the second and thirteen under the last. The structure of the wood of each species is described and the habitat given. Aside from the value of the descriptions, the citations of synonomy and bibliography will be appreciated by all students who have occasion to study this class of fossil plants.

Babcock Herbarium. (Rept. Dept. Nat. Hist. Northwestern Univ. 1888, pp, 9, 10).

An account of the donation and probable extent of the above herbarium, now in the possession of the Northwestern University.

Babcock Herbarium—List of Mosses in the. (Rept. Dept. Nat. Hist. Northwestern Univ., 1889, pp. 14-16).

Beggiatoa alba and the Dying of Fish in Iowa. L. H. Pammel. (Abstract, Proc. Iowa Acad. Sci., 1887-9, pp. 90, 91).

Bignonia rugosa. J. D. H. (Bot. Mag. Tab. 7,124).

Brodiæa multiflora. Carl Purdy. (Zoe, i. 101-102).

Catalogue of Plants Growing without Cultivation in Ripon and the Near Vicinity. Mrs. C. F. Tracy. (Pamph. pp. 26, Ripon, Wis., March, 1889).

Catalogue of the Mosses in the Collections of Dr. Vasey and Dr. Lapham, now in the University Herbarium. (Rept. Dept. Nat. Hist. Northwestern Univ. 1889, pp. 17-19).

Cherry Disease—A. L. H. Pammel. (Abstract, Proc. Iowa Acad. Sci. 1887-9, pp. 92-94).

A description of *Cylindrosporium Padi*, Karst., supposed by some to be identical with *Septoria Pruni* and *S. Cerasina.*

Ciperaceas de Mexico—Nota acerca de las. P. Maury. (La Naturaleza (II) i. 294-296; translated from Bull. Soc. Bot. France).

Cotton Root-Rot. L. H. Pammel. (Bull. No. 7, Texas Agric. Exp. Sta., Nov. 1889. Pamph. 8vo. pp. 30, Pl. I–V).

Ozonium auricomum is figured.

Cypress Knees—The Causes of. S. V. Clevenger. (Am. Nat. xxiv. 581).

In this contribution to the much discussed question, the author refers to a previous article in which the anchor and buttress theory of the angular roots was advocated, and suggests that the strain which inevitably occurs at the angles would result in sap exudation and the piling up of indurated tissue such as is found in the "knees." In support of this proposition he quotes from Herbert Spencer's Principles of Biology as follows: "Many commonplace facts indicate that the mechanical strains to which upright gravity plants are exposed, themselves cause increase of the dense deposits by which such plants are enabled to resist such strains."

Doubling of Flowers—Observations upon. Byron D. Halsted. (Pop. Sci. Monthly, xxxvii. 374-381).

In a popular form the author gives an excellent resumé of the facts and theories in regard to the transformation of parts and the abnormalities of structure occurring in nature and induced by cultivation.

Elements of Structural and Systematic Botany for High Schools and Elementary College Courses. Douglas H. Campbell. (8vo., pp. ix + 253, Boston, Ginn & Co., 1890).

This little book is a welcome addition to our available material for teaching the general principles of Botany. It consists of chapters on the structure of cells and tissues, followed immediately by others on the classification of plants, the primary subdivisions recognized being (1) Protophytes, including Slime Moulds, Schizophytes and Volvocineæ; (2) Algæ, grouped under the Green, the Brown and the Red; (3) Fungi, including as classes, Phycomycetes, Ustillagineæ, Ascomycetes and Basidiomycetes; (4) Bryophytes; (5) Pteridophytes and (6) Spermaphytes (why not Spermatophytes?) Under this last group we note one of the most valuable features of the book, viz., the departure from the generally accepted arrangement of the angiosperms, and the substitution therefor of modern ideas of classification. The difficulty in the use of the system here adopted will be in the lack of floras arranged on a similar plan. Chapters are devoted to the fertilization of flowers and to histological methods. The book is illustrated by one hundred and twenty-eight cuts, nearly all of them new, exhibiting the structure of all the larger groups, and they are among the most valuable elements of the volume. N. L. B.

Fresh Water Algæ. (Rept. Dept. Nat. Hist. Northwestern Univ. 1890, pp. 18-21).

A list of one hundred and four species, collected in Cook Co., Illinois.

Fungous Diseases of Fruit Trees in Iowa—Some. L. H. Pammel. (Abstract, Proc. Iowa Acad. Sci., 1887-9, pp. 91, 92).

Description of *Entomosporium maculatum.*

Fungi Affecting Fishes—An Aquarium Study. Samuel Lockwood. (Journ. N. Y. Mic. Soc. vi. 67-85, Pl. 23-24).

This article is divided into two parts, one dealing with *Saprolegnia*, the other with *Devæa*, a new genus allied to the former. *Saprolegnia ferox* and *Devœa* are both figured. In the latter genus is described and figured a new species, *D. infundibus*, found upon *Hippocampus* in captivity.

Heterosporous Fern Allies of the Pacific Coast and Mexico. Lucien M. Underwood. (Zoe, i. 97-101).

An enumeration with critical notes and citations of known localities for the species of *Isoetes*, *Marsilia*, *Pilularia* and *Azolla*. *I. Pringlei* is described as new from Guadalahaja, Mex. (Pringle, No. 2,633); *Azolla filicoides*, Lam., recently collected by Mr. Brandegee in San Mateo Co., Cal., is new to the United States flora. Prof. Underwood is mistaken in his statement that "the last catalogue of Mexican Pteridophytes was by Fournier (1872)." Mr. Hemsley's Botany of the Biologia Centrali-Americana enumerates those known up to 1886. Professor Underwood now lists just twice the number of heterosporous species there recorded. N. L. B.

Hickory—The False Shagbark (*Hicoria microcarpa*). L. H. Bailey. (Amer. Gard. xi. 386-389; eleven illustrations).

Professor Bailey contributes an exceedingly valuable essay on this interesting tree and its relations to the Shag-bark and Pig-nut Hickories. He contends, and to our mind establishes conclusively, that it is a well-marked species, its nearest ally being the Pig-nut, from which it may readily be distinguished, however, by its thin-shelled, strongly beaked nut with dehiscent husk, sweet edible meat, and its shaggy bark, which splits off in narrow strips. The observed range given for the tree is from New York to Michigan and south to Delaware. With this paper in hand botanists will doubtless be able to considerably extend these limits. It is quite as abundant as the Pig-nut in the vicinity of New York City. N. L. B.

Ilex longipes. W. Trelease. (Gard. and For., iii. 344, fig. 46).

Insular Floras. Lorenzo G. Yates. (Reprint from Ninth Ann. Rept. State Mineralogist Calif. pp. 11-20; no date).

The exceedingly interesting flora of San Miguel, Santa Rosa, Santa Cruz and the Anacapas, to which attention has been brought from time to time by our West Coast botanists, is here catalogued, so far as known, with locality and name of collector after each species.

Lueddemannia Pescatorei. J. D. H. (Bot. Mag. Tab. 7123).

Masdevallia Carderi. J. D. H. (Bot. Mag., Tab. 7125).

Medicinal Plants of Alabama—The. Chas. Mohr. (Pamph. 8vo, pp. 17, Mobile, Alabama).

This list is of much value to the apothecary, and, so far as it goes, to the botanist also. The number of species enumerated is necessarily limited, but the notes on distribution are full, and common names are given for each species.

Medicinal Plants of the State of Minnesota—An enumeration of the. Carl Weschcke. (Pharm. Rundsch. viii. 155-157).

Micromycetes Novi. P. Hariot and P. A. Karsten (Journ. Mycol. xii. 129-131).

Calosphæria Smilacis and *Cornularia Rhois* collected by Lesquereux in Ohio are described as new.

Microseris—The Pappus of. T. S. Brandegee. Zoe, i. 126-127).

Mosses—New Canadian. N. C. Kindberg. (Ottawa Nat. iv. 61-65).

In this number are described one new species of *Dicranum* one *Physcomitrium*, one *Webera*, a new *Thelia*, a new *Thuidium*, two *Brachytheciums*, one *Isothecium*, one *Rhynchostegium*, two *Amblystegiums* and one *Harpidium* besides four new varieties and two subspecies. E. G. B.

Naturalized Plants of Southern California—III. S. B. Parish. (Zoe, i. 122-126).

Among these interesting notes is one on the introduction by the Chinese of *Sagittaria Chinensis* at San Bernardino.

Notes on North American Trees—XVIII., XIX. C. S. Sargent. (Garden and Forest, iii. 331, 332 and 344).

Descriptions of the wood of the following species are given: *Helietta parvifolia*, *Kœberlinia spinosa*, *Ilex monticola*, *Ceanothus velutinus*, *var. arboreus*, *Rhus integrifolia*, *Cercidium floridum*, *Acacia Farnesiana*, *A. flexicaulis*, *Prunus ilicifolia*, var. *occidentalis*, *Cratægus Crus-galli*, var. *berberifolia* and *Lyonothamnus asplenifolius*.

Notes on some of the rarer Plants found in Blue Earth and Pipestone Counties, Minnesota. John B. Leiberg. (Bull. Minn. Acad. Nat. Sci. iii. 37, 38).

Otacanthus--Sur les Characteres des. H. Baillon. (Bull. Mens. Linn. Soc. Paris, No. 104, 831, 832).

Differing from Mr. Bentham, M. Baillon holds that *O. cæruleus,* Lindl., belongs to the Scrophularineæ rather than to the Acanthaceæ, and that the plant collected by Pearce in Bolivia referred to in the "Genera Plantarum" under *Otacanthus,* represents a distinct genus of true Acanthaceæ, and proposes for it the name *Tacoanthus Pearcei,* the generic name derived anagrammatically.

N. L. B.

Penstemon gentianoides. (Garden, xxxvii. 603, illustrated).

Philadelphia Botanists—Some early. W. E. Leonard. (Bull. Minn. Acad. Nat. Sci. iii. 29-37).

Notes on the life and works of Schweinitz, Nuttall, Rafinesque and Darlington.

Pinus Tæda, L.—The Old Field or Loblolly Pine. J. T. Rothrock. (Forest Leaves, iii. 25, illustrated).

Plantæ Glazioviance novæ vel minus cognitæ. P. Taubert. (Beiblatt zu Engler's Bot. Jahrb. xii. Heft 1).

New species of Brazilian Plants collected by Dr. A. Glaziou are described in the following genera: *Dichorisandra, Barbacenia, Brosimum, Daphnopsis, Adenostephanus, Roupala, Aristolochia, Triplaris, Tetraplacus, Patagonula, Belangera, Weinmannia* and *Macrodendron,* a new genus of Saxifrageæ; a number of the descriptions are by Dr. C. Mez.

Plants of Santa Catalina Island. T. S. Brandegee. (Zoe i. 107-115).

Notes on several of the more interesting plants of the island, with a list of species supplementary to Mr. W. S. Lyon's catalogue printed in the Botanical Gazette, 1886.

Ptelea aptera. (Garden and Forest, iii. 332, fig. 45).

Revised Names of Plants of New Jersey, Extracted from Britton's State Catalogue. H. H. Rusby. (Reprint from Drug. Bull. July, 1890, pamph., pp. 23).

In this handy little pamphlet the author has arranged alphabetically all the changes in nomenclature from Gray's Manual and other recent text books and catalogues. The list is a timely one, and will be found very useful.

Report of the Department of Botany, Iowa State Agricultural College and Farm. L. H. Pammel. (Reprint from 13th Bien. Rept. Board of Trustees, 1888 and 1889, pp. 42-48).

This report is principally taken up with brief notes upon some of the recently introduced weeds, such as *Cuscuta epithymum*, *Solanum Carolinense*, *S. rostratum* and *Lactuca Scariola*, also loco-poisoning, due to *Crotalaria sagittalis* and *Astragalus mollisimus*.

Sand-hill Flora—Characteristic. M. A. Carleton. (Trans. Kans. Acad. Sci. xii. Part i. 32-34).

A list of eleven observed species is given for the region of the sand hills in the principal river valleys of Kansas. The species thought worthy of mention under the above title are: *Prunus Chicasa*, *Lithospermum hirtum*, *Evolvulus argenteus*, *Yucca angustifolia*, *Discopleura capillacea!* (which grows with us in swampy land or even in water), *Viola tricolor*, var. *arvensis*, *Cristatella Jamesii*, *Linaria Canadensis*, *Aplopappus divaricatus*, *Frœlichia gracilis* and *Hosackia Purshiana*.

Silk Cotton Tree—The. (Garden and Forest, iii. 341, 342, illustrated).

Under this title is a description and representation of a tree of *Eriodendron anfractuosum*, from a specimen in front of the town-house of Nassau, West Indies.

Some Western Plants. Wm. M. Canby. (Bot. Gaz xv. 150).

Astragalus Tweedyi, identical with specimens collected and distributed by Mr. Howell as *A. collinus*, Dougl. is described as new. Mr. Canby relegates *A. Californicus*, to *A. collinus*, Dougl., var. *Californicus*, Gray. A doubtful species of *Erigeron*, allied to *E. pumilus*, is described under the provisional name *E. Scribneri*.

Trillium sessile, var. *Californicum.* (Garden and Forest, iii. 320, fig. 44).

Varieties Not Soon Wearing Out—Some Reasons for. Byron D. Halsted. (Am. Nat. xxiv. 577-581).

Willows Presented to the Henry H. Babcock Herbarium by M. S. Bebb, Esq., of Rockford, Ill. (Rept. Dept. Nat. Hist. Northwestern Univ. 1889, pp. 20-23).

This list includes a list of hybrids and also a description of *Salix glaucophylla*, Bebb, and its varieties.

MISS
BOTANI
GARI

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVII.] New York, September 6, 1890. [No. 9.

New or Little Known Grasses—II.*

BY F. LAMSON-SCRIBNER.

(Plates CV–CVIII).

Some months ago I received from the Botanist of the United States Department of Agriculture specimens of a diœcious grass—both the male and female plants—collected on the sandy coasts of Lower California, by Dr. E. Palmer. The characters presented by these specimens were in some respects remarkable and wholly unlike any species known to me. The characters of the female plants at once suggested those of *Jouvea straminea*, Fourn. (Bull. Soc. Roy. Bot. de Belgique, xv. p. 475) and a very careful further study of the material in hand has led me to the conclusion that this grass is none other than that rare species, which was unknown to Bentham and has never been seen by Prof. Hackel. While differing in some apparently essential points from the published descriptions of *Jouvea straminea,* there is such an agreement in the characters, especially in those which are most remarkable, that until we can make a comparison with the type, I must consider our plant certainly *Jouvea,* and in all probability *J. straminea,* which is diagnosed by Fournier (in Pl. Mex. ii. p. 68) as follows:

JOUVEA. Gramen littoreum, junciforme. Spica terminalis, cylindrica acuta. Spiculæ unifloræ, dioicæ, in rhachide immerse et illi in parte inferiore adnatæ. Masculæ non notæ. Feminearum glumæ *duæ,* exterior cartilaginea, straminea, *interna hyalina,* apice tantum a rhachide distincta. *Palcæ duæ, augustæ minores ;* stylus longus, stigmatibus 2, flore exeuntibus ; *squamulis triangularibus.*

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* For No. 1, see BULLETIN, xv. 8–10.

J. straminea. Culmo striato, angusto, pedali, stramineo, glabro, nodis nigrescentibus, merithalliis 1-foliolatis; ligulis laciniatus pilosis, foliis linearibus, acutis, brevibus, pungentibus; spicis femineis 1–2, terminalibus cylindricis acutis; spiculis 1–3, alternis in rhachide immersis; gluma exteriore ab axe fissura tantum in parte superior discreta, *interior hyalina;* caryopsis immatura, in stylum *attenuata*, stigmatibus 2, plumosa, emergentibus.—In arena littoralis meris Pacifici, San Augustin (Lehm.).

Fournier saw only the pistillate plant and the specimens from which his description was drawn were evidently young, for he says: "caryopsis immatura." The specimens collected by Dr. Palmer are all very old and this difference in the state of the plants may account for some of the differences in the characters between our specimens and those described by Fournier. The points of disagreement in the above quoted description are in italics.

In our plants the outer glume in the ♀ spikelet is grown to the rhachis for four-fifths or five-sixths of its length. If it is understood that "in parte inferiore adnatæ," can only mean "adnate for half their length" or "their lower half adnate," we have a character not applicable to our plant; but does the expression demand a rendering which limits so definitely the extent of adnation? It is possible that in young plants the glumes are not so completely grown to the rhachis as in those which are mature.

In Palmer's specimens the limits of the adnate, cartilaginous outer glume are clearly visible in a transverse section of the spike made near the base of the spikelet and the cellular structure seems to indicate that it is seven-nerved. On the inner face and continuing entirely around the grain-cavity are several layers of dense sclerenchyma cells. Those cells which line the back of the cavity may belong to the "hyaline inner glume," but this glume cannot be distinguished excepting at the free apex, where it is grown by its edges to the outer glume, thus forming a short tube through which the rather stout style projects (fig. n, pl. CVI.)

I have been unable to find any traces of a flowering glume or palea. Fournier found both these organs, and although he mentions their shape and size, he says nothing of their texture. If they were very thin and hyaline, it is possible that they may have become adnate to the mature grain and wholly undistinguishable. The outer layer of irregular, thin cells covering the grain, seen in transverse sections, may belong to these organs.

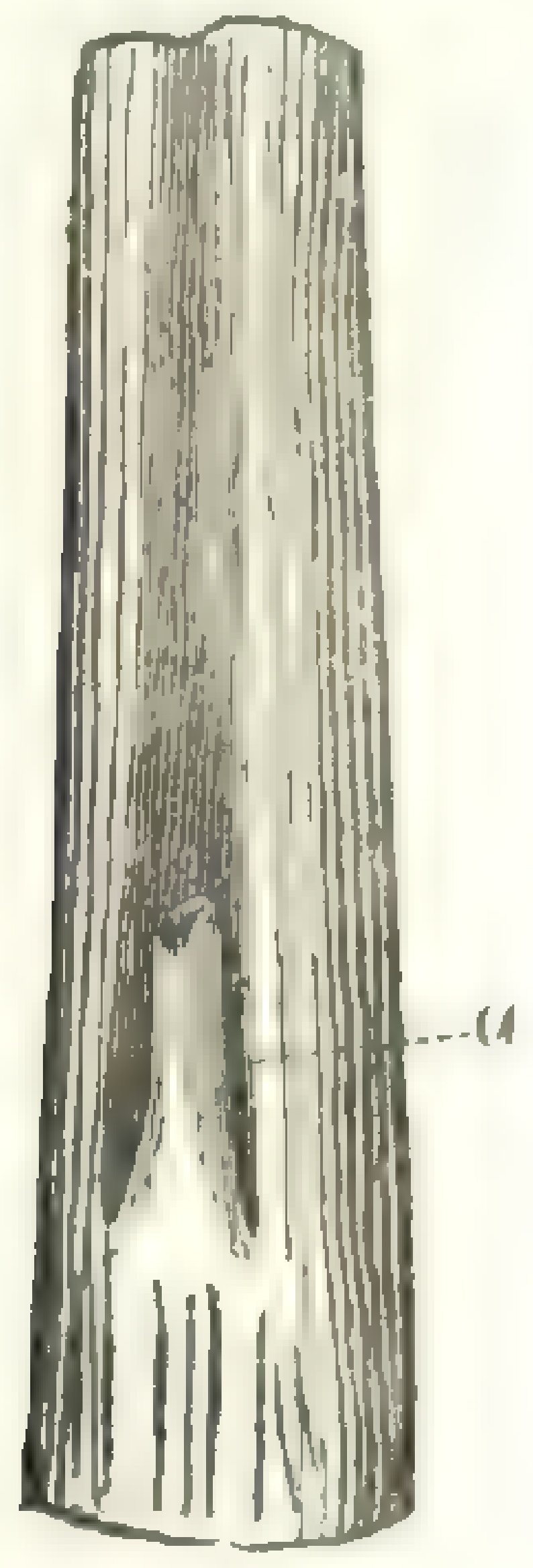
In all the characters excepting those here noted, and which we have tried to account for, our plant accords with *Jouvea straminea*, Fourn. The type specimens were collected on the sandy shores of the Pacific, within the same region as those gathered by Dr. Palmer, and although it is possible that two genera possessing such unusual characters might exist in that region, growing under like conditions, and have escaped the notice of botanists until now, it certainly does not seem probable, and considering that our plant agrees in so many and striking particulars with the published description of *Jouvea*, I think we ought to try to explain or harmonize any apparent differences rather than attempt to establish a new genus. Certainly it would be unwise to do this before we are assured of a valid distinction by a comparison with Fournier's types.

The characters of the genus *Jouvea*, based upon our specimens, are as follows:

JOUVEA, Fourn.

Spikelets unisexual, diœcious, very dissimilar, ♂ much compressed, many-flowered, spicate on slender terminal or lateral peduncles, rhachilla continuous. Empty glumes two, thin, the second one-nerved and larger than the first (in old specimens the empty glumes, particularly the first, are rarely present); flowering glumes longer and broader, carinate, acute herbaceo-chartaceous, three-nerved; palea broad and prominently two-keeled, stamens three. Female spikes one–several in terminal fascicles on the culm or its branches, enclosed below by the leaf-sheaths or broad prophylla terete, acute, articulated at base and falling off entire. Spikelets one-flowered, embedded in the continuous rhachis, adnate below. Outer glume cartilaginous, abruptly narrowed towards the free apex. Style single, long-exserted; stigmas two, plumose. Grain subterete, free.

Jouvea straminea, Fourn.? (*Rachidospermum Mexicanum*, Vasey, Bot. Gaz. xv. 110). Culms erect froma creeping rhizome, about 30 cm. high, striate, smooth, solid, the internodes flattened or sulcate upon alternating sides branched, the branches erect and enveloped at the base by the short and somewhat dilated leaf-sheaths and strong prophylla, the latter being remarkably developed in aborted branches of the ♀ inflorescence. Lower sheaths crowded and over-lapping, those above much shorter than the internodes; ligule a ciliate fringe of short hairs, the hairs at the sides longer; leaves 1-10 cm. long, the uppermost shortest and divergent, all pungent-pointed, conduplicate, scabrous on the prominent striæ of the upper surface and a few scattering hairs near the margins. Staminate spikes 3-6 cm. long; spikelets three to six, sessile on alternate notches of the slender rhachis, 1½-3 cm. long, about 3 mm. wide, much compressed, ten- to eighteen-flowered. Flowering glumes 4-5 mm. long, broadly lanceolate, acute, with a strong keel, which is scabrous above, and a distinct lateral nerve on each side about half as long as the glume. Paleas somewhat shorter than the glumes, finely scabrous on the prominent keels. Female spikes 2-3 cm. long, somewhat concave on one side near the base, otherwise terete and very sharp-pointed, often a little curved and spur-shaped; spikelets one to three, alternate, 6-8 mm. long, deeply embedded in the rhachis to which the glumes are firmly adnate for four-fifths or five-sixths of their length. Style springing from one side of the top of the ovary, often bent back near the base and projecting through the conical-tubular apex of the glumes. Grain about 6 mm. long.



A portion of a ♀ spike of *Jouvea straminea*, Fourn.? showing the tubular free apex of the glumes, *a*.

I have referred this grass to *Jouvea straminea* with a query because Fournier's description, drawn as it was from an immature female plant, renders a positive identification from this alone, nearly impossible.

It appears* that the male and probably also female plants of this grass were collected at Cape St. Lucas, Lower California, by Xantus in 1859-'60. The first (No. 121 of the collection) was referred by Dr. Gray, in his account of Xantus' plants, to the present genus *Distichlis*. Of the probable female plant (No. 119) it is said "a new grass of uncertain genus, the single specimen mislaid." Very likely the male plant has been already published under *Brizopyrum* or *Distichlis*, to which genus it bears a general resemblance, but from which it differs markedly in its solid culms, its manner of branching, sessile spikelets and three-nerved flowering glumes. Fournier, who knew only the female plant, allied *Jouvea* with *Buchloë*, and Bentham followed him in Genera Plantarum (vol. iii. p. 1173). The genus has, however, no affinities with the Chlorideæ. Judging from the characters of the female spikes, as given by Fournier, Prof. Hackel (in Engl. und Prantl, Nat. Pflanzenfam. 2, vol. ii. pp. 76, 78; the "True Grasses," pp. 170-174) placed *Jouvea* near *Monerma* and *Ischnurus* in Hordeæ. Although the position here assigned is, to me, unsatisfactory, I am unable to find another where the peculiar characters of the grass will render the relationship less questionable. As the tribes of the family are defined by Bentham and by Hackel our grass would certainly fall under Hordeæ, and would not fall under any of the others excepting the characters of these be modified. If properly referred, it is remarkable as being the only diœcious grass among the Hordeæ.

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*Botanical Gazette, xv. p. 109.

PENTARRHAPHIS FOURNIERANA, Hack. & Scribn.

Among the plants collected by Mr. C. G. Pringle in Guadalajara, Mexico, in 1889, there is a grass which in a recent collection from the same region (Palmer No. 200, 1886) was referred to *Bouteloua*, (*B. Fourierana*, Vasey, Proc. Amer. Acad xxii. 461, without description) but from which genus it differs in several essential characters. I sent samples of this grass, along with some others of Pringle's collection, to Prof. Hackel, and in referring to the lot Hackel says: "There are several very interesting species in it, and above all there is what I believe to be the long-forgotten and doubtful genus *Pentarrhaphis* of Kunth, represented by Pringle's No. 2559. It does not match fully the species described by Kunth in Humb. Bonpl. Nov. Gen. et. Spec. i. p. 178, t. 60, viz. *P. scabra*, but differs in several points, chiefly in having *two* spikelets on each node of the rhachis instead of one, and in the smaller number of setæ at the base of the twin spikelets. These setæ, which Kunth believed to be the teeth of a supposed "gluma sterilis inferior," are in my view, the relics of a whole rudimentary spikelet. You will often have observed in several Boutelouæ (the genus to which *Pentarrhaphis* is very nearly allied) that the rhachilla of the spikelet is headed by a group of bristles (in *B. multiseta*, for example, by many) which are reduced glumes. Now in *Pentarrhaphis* I believe the group of bristles at the base represents a whole rudimentary spikelet. The number of these setæ seems to be somewhat variable, as is often the case with rudimentary organs. As you have fuller materials for investigation I invite you to make a closer study of it, and should you gain the same opinion as myself regarding it, I propose for the species the name *Pentarrhaphis geminata*, Hack. & Scribn.

"I believe that *Polyschistis*, Presl. (in Rel. Hænk. i. p. 294) is quite the same genus, and his *P. paupercula* seems even to be very nearly allied to *Pentarrhaphis geminata*. But I can only judge of this from Presl's figure, not from authentic specimens, which I sought for in vain in the Vienna Herbarium. Presl says that Hænke collected it in Luzone, but he very often confounded plants from Mexico with those from the Philippines, and *vice versa*."

After making a careful investigation of the spikelets and the bristles or setæ accompanying them, I communicated my conclusions, detailed below, to Prof. Hackel, and in reply he says: "I fully agree with you in the signification that you give to the various bristles that accompany the base of the twin spikelets. As to the number of five bristles, described by Kunth, I venture the view that one of them was the outer glume, the rest forming two pairs, each representing a sterile spikelet. I found also in your specimen one example of a single spikelet [in the cluster] and I think it was accompanied by five or six bristles."

I found several such examples as here referred to, in my specimens, always the lowermost clusters in the racemes. Fig. B, Plate CVIII illustrates one of these. At the base of this spikelet on the upper or outer side, is the second empty glume, *a*, while on the lower or inner side are several strongly pilose setæ (three of which are undistinguishable from one another when dry, the fourth being evidently the second spikelet very imperfectly developed. From the position of these setæ they might easily be mistaken for a quadripartite lower glume, such as Presl describes for *Poly-*

schistis, "gluma inferiora quadripartita, flora brevior, laciniis lineari-subulatis, pilosis." Supposing one of these bristles to have been bifid, as at *c*, plate CVII, only more deeply so, there would then exist a striking resemblance to the lower glume of *Pentarrhaphis,* as described by Kunth: "gluma inferior ex aristis quinque basi subconnatis composita."

In the clusters or fascicles with two well developed spikelets these spring from a very much shortened, hirsute axis so that they appear to stand opposite each other, the backs of their lowest glumes coming together, see figure A, plate CVIII. Between the spikelets are three setæ or awn-like bristles, one of which is often more or less deeply two-parted. These bristles, shown more clearly in figure C, are sub-equal in length, similarly pilose and projecting in the same line of growth with the spikelets, and appear to be, at least when examined dry, all of the same nature. If moistened, however, and then carefully examined under a lense, two of them will be found to have upon each side below a narrow membranous margin (see figs. *b'*, *b'*, plate CVII); this character, together with that of their position, determines them to be the lower empty glumes of the two spikelets. The third seta is either simple or bifid and originates at a point a little to one side or in advance of the lower empty glumes. It may be said to occupy the centre of the fascicle of which it forms a part, representing the rudiment of a third spikelet. That it is not a continuation of the partial rhachis, but really the representative of a third spikelet, is determined, I think, by the following characters: (1) its direction of growth in the same line with the fully developed spikelets; (2) its springing from the same very hirsute and condensed axis of these spikelets, which is (to me an important point in this connection) articulated with the short pedicel from the main rhachis; (3) its being pilose like the empty glumes, the extended midribs or awns of which it most closely resembles. In those Boutelouæ with which I am familiar, wherein the rhachis of the spikes is produced beyond the spikes, the primary direction of this rhachis is continued, and although it may be reduced to a sharp point or even become notched or bifid as in *Bouteloua disticha,* Benth. (*Polyodon distichum,* HBK.) there is no question as to its true character.

Assuming that the foregoing views respecting the nature of the setæ at the base of the single spikelet or pair of spikelets, to be correct, the genus *Pentarrhaphis*, placed among those regarded as doubtful by Bentham (Gen. Pl. iii. p. 1090) and founded upon a single Mexican species which has been completely lost to recent botanists, may be characterized as follows:

PENTARRHAPHIS HBK. Nov. Gen. et Spec. i. p. 177, t. 60. (*Polyschistis* Presl, Rel. Haenk. i. 294, t. 41).

Tribe Chlorideæ.

Spikelets one to two in each fascicle-like spike, accompanied by one to four shorter, awn-like rudiments, two-flowered, the first flower ♀, the second ♀ or ♂; rhachilla produced into a short simple bristle behind the palea of the second floret. Empty glumes two, one-nerved, the first very narrow, awn-like when dry, the second somewhat longer, lanceolate, usually two-toothed, awned between the teeth; flowering glumes five or seven-toothed, the middle and marginal teeth extending into a long, divergent, scabrous awn. Palea strongly two-nerved, two-toothed or sometimes briefly two-awned. Stamens three; styles distinct. Stigmas projecting from the sides of the florets, penicilliform. Lodicules two, dolabriform. Grain oblong, free. Low, slender, tufted grasses with erect, simple or branched flowering culms and narrow flat leaves. Spikes very short, secund and rather remote along the flexuose and sometimes arcuate rhachis, articulated with the very short pedicels and falling off entire.

The disposition and appearance of the clusters of spikelets and also their deciduous character are the same as in *Ægopogon*; their external resemblance to *Melanocenchris*, with which this genus is very closely allied, is even more marked. In the first, however, the separate spikelets are one flowered and pedicellate in the clusters; in the second, the spikelets are one-flowered, above which the rhachilla bears several empty bracts similar to the flowering glume. From *Bouteloua*, section Triathera, *Pentarrhaphis* may readily be distinguished by its two-flowered spikelets and simple, bristle-like prolongation of the rhachilla.—Species three, two certainly and probably also the third, Mexican.

P. FOURNIERANA, Hack. and Scribn. Culms densely crowded along a creeping rhizome forming a thick, dense turf, erect, 18 to 25 cm. high; nodes silky villous with erect hairs; sheaths very slightly inflated, sparsely pilose and hairy at the throat; ligule a ring of short hairs; leaves about 1 mm. wide, pilose, especially the longer ones from the base, upper leaves 1½ to 3 cm. long, all very acute; spikes three to six, secund-racemose along the somewhat compressed rhachis. Spikelets two in each cluster with a single, simple or bifid, awn-like rudiment of a third, sessile. Empty glumes pilose with rather long, stiff hairs, hirsute at the base, much shorter than the spikelets; flowering glumes densely hairy at the base and more or less pilose along their margins.—Mexico, (Pringle, No. 2,559, 1889; Palmer, 200, 1886).

Pentarrhaphis scabra, HBK., has taller, and branched flowering culms, longer and broader leaves, one spikelet only at each node of the main rhachis, and the lower empty glume and the bristle-like rudiments (according to the illustration in Nov. Gen. et Spec.) are simply scabrous (see fig. *w*, plate CVIII).

In *Pentarrhaphis paupercula*, (*Polyschistis paupercula*, Presl), the lower leaves are short, like the upper ones, spikelets single at the nodes of main rhachis, and short pedicel of the second floret (joint of the rhachilla) pilose. (See figs. x and x′, plate CVIII). According to Presl this species is annual. The descriptions and illustrations of these species given by Kunth and Presl permit of the following brief synopsis of them.

Spikelets two in each cluster, rudiment a single simple or bifid, pilose bristle.....................................1. P. FOURNIERANA.
Spikelets one in each cluster, rudimentary bristles three or four.
  Bristles and pedicel of the second floret scabrous...2. P. SCABRA.
  Bristles and pedicel of the second floret pilose.....3. P. PAUPERCULA.

EXPLANATION OF PLATES.

Plate CV.

Male and female plants of *Jouvea straminea*, Fourn.? reduced in size.

Plate CVI.

a.—A portion of the ♀ inflorescence.

b.—A one-flowered ♀ spike, enclosed at the base by a leaf.

c.—A similar spike with the leaf removed, showing prophylla, x.

d.—A two-flowered ♀ spike.

e.—A similar spike, the lower portion in longitudinal section, showing grain cavities.

f.—A section of the lower part of a ♀ spike, made in the same plane as the glume, showing grain, etc.

g.—Grain with a portion of the style.

h, i, k.—Transverse sections of the spike across a spikelet, showing the grain within.

l, m.—Transverse sections of the grain, *l*, includes the embryo.

n.—Free apex of the glumes.

o.—Staminate spikelet.

p.—Floret of same.

r.—Flowering glume of ♂ floret expanded.

s.—A stamen.

t.—A portion of the stem and a branch with a prophyllum, x.

u.—Transverse section of the culm.

v.—Transverse section of a leaf.

w.—Figure showing the ligule.

Plate CVII.

H.—A plant of *Pentarrhaphis Fournierana*, somewhat reduced.

b′, *b′*.—First empty glumes of the two spikelets, moistened and membranous margins pressed out.

a.—Second empty glume.

f l.—Flowering glume of the first floret.

P.—Palea of same.

c.—Bifid rudiment of the third spikelet.

K.—Pistil with lodicules with scale of enlargement indicated.

L.—Lodicules spread out.

Plate CVIII.

A.—Spike or cluster of spikelets with portion of main rhachis, r.

C.—Cluster of spikelets spread apart to expose the bristle-like lower glumes, *b*, *b*, and bifid rudiment, *c*.

B.—Cluster of spikelets in which the second spikelet is reduced nearly to the form of the bristles.

c.—Anterior view of the pedicellate second floret, showing the prolongation of the rhachilla, f.

w.—Cluster of spikelets of *Pentarrhaphis scabra*, the florets separated from the empty glumes and bristles.

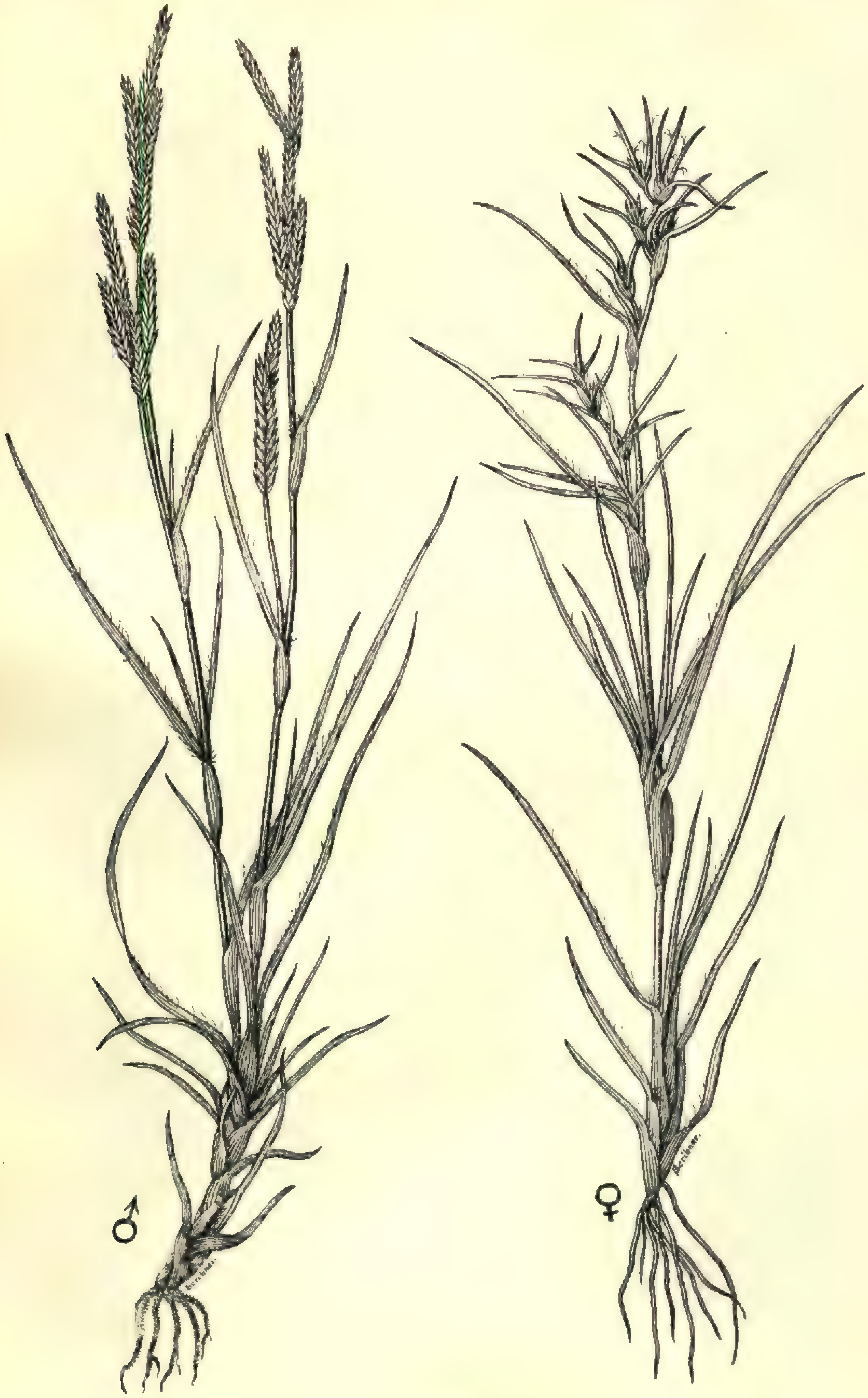
v.—First floret of same.

u.—Second floret of same, showing prolongation of rhachilla, f′.

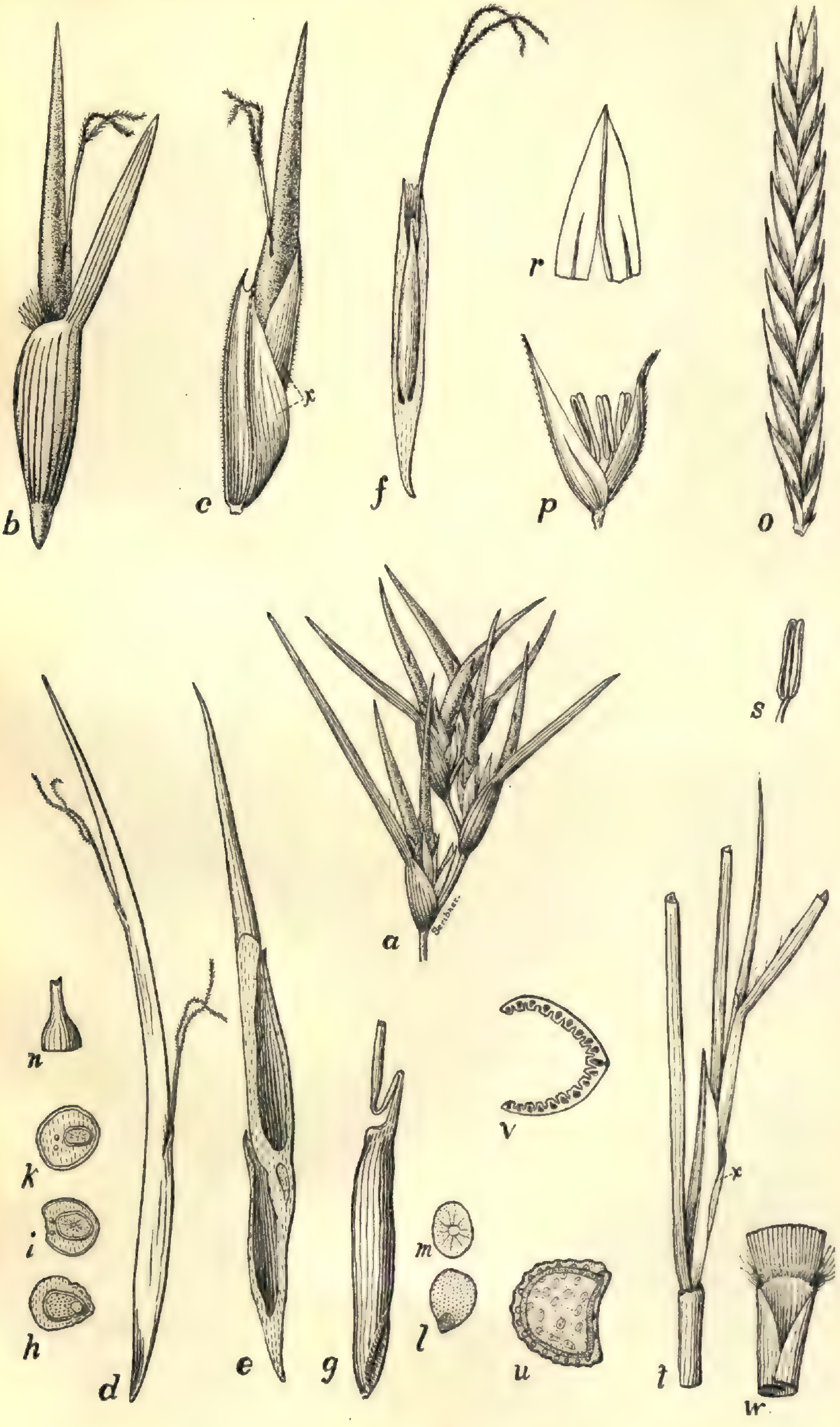
X.—Cluster of spikelets of *Pentarrhaphis paupercula* (*Polyschistis paupercula*, Presl).

X′.—Second floret of same, showing the pilose pedicel.

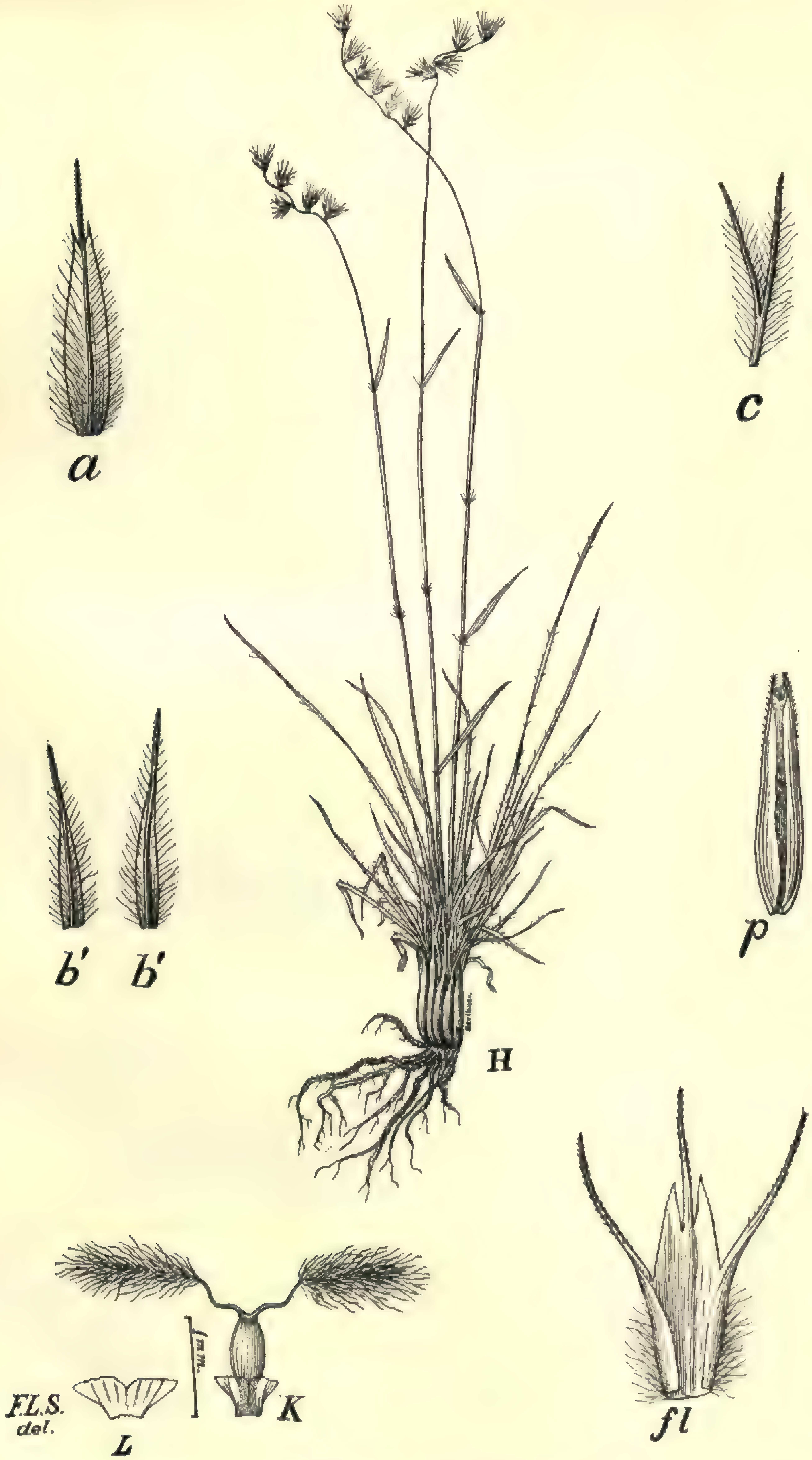
All of plates CV, CVI and CVII, and figures A, B, C and *c* of plate CVIII original. Figures *u*, *v* and *w*, redrawn from Kunth; figures X and X′, redrawn from Presl.



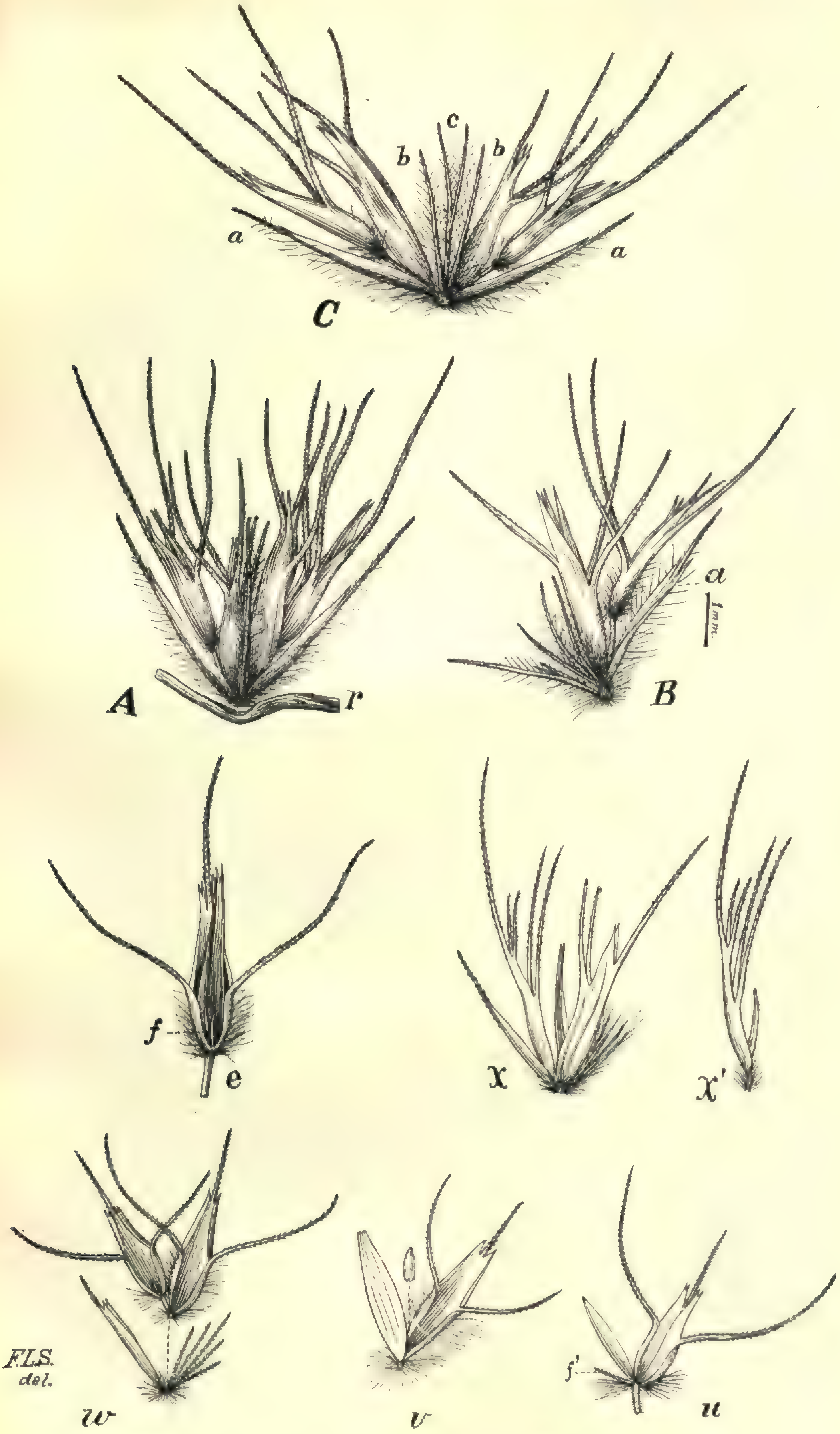
JOUVEA STRAMINEA, Fourn. ?



JOUVEA STRAMINEA, Fourn.?



PENTARRHAPHIS FOURNIERANA, Hack. & Scribn.



PENTARRHAPHIS FOURNIERANA, Hack. & Scribn.

Proceedings of the Botanical Club of the A. A. A. S., Indianapolis Meeting, August, 1890.

THURSDAY, AUGUST 21st.

The President, Dr. N. L. Britton, in the chair, Dr. C. R. Barnes, Secretary.

Dr. Britton spoke on "The Present State of Systematic Botany in North America," alluding to the great amount of investigation now being done at the several centers of work, the increasing number of specialists and the general satisfactory condition of the science.

Mr. Fernow remarked on his new check-list of North American trees, the nomenclature based for the most part on the recent writings of Professor Sargent and compiled by Mr. Sudworth. The list will give both scientific and common names; in the compilation of the latter he asked the assistance of botanists all over the country.

Mr. C. M. Weed exhibited specimens of *Actinella acaulis* from Lakeside, Ohio, where it appears to be native. This greatly extends the range of the plant to the East. Professor Bessey stated that it occurred in Nebraska on hill-tops.

Mr. Weed also read a paper on "The Milky Juices of Plants as a Protection against Insect Borers." He had found this hold true in many plants, but *Lactuca Canadensis* seemed to be an exception. Professor Burrill said that the same fact had been reported to him from Greece in the case of the fig, *Ficus Indica*, the plant being artificially slashed to prevent insect depredations.

Professor Beal described small tubers detected by him on the roots of *Ceanothus Americanus*. Professor Burrill remarked that it would be interesting if these should prove to have the same functions attributed to the tubercles borne so abundantly in the Leguminosæ. Dr. Britton called attention to an observation by Dr. Thurber on the occurrence of tubers on *Rhexia*.

Professor Burrill remarked on the genus *Bacterium*, maintaining that it should be recognized as valid.

FRIDAY, AUG. 22.

Mr. B. D. Galloway presented a paper by Miss Effie A.

Southworth on "A New Hollyhock Disease," caused by the hitherto undescribed fungus *Colletotrichium Althææ.*

Professor Scribner remarked on "The Nature of the Palea and Lodicules in Grasses."

The conclusions drawn were:

1. That the palea are two-keeled prophylla which begin the floral branch, and like those of the culm-branches, stand with their backs toward the main axis or rhachilla of the spikelet; when the flower is carried back on to the rhachilla the palea is wanting.

2. The lodicules are true scales, in that they belong to the epidermal system, and their sole function is to separate the glumes in anthesis, as the special epidermal development in the axils of the panicle-branches serves to diverge these during the same period by pressing against the axis from which the branches arise.

Professor Lazenby called attention to two marked forms of the Virginia Creeper, *Vitis* (*Ampelopsis*) *quinquefolia*, one of which clings readily to houses and other structures, while the other does not. The clinging one appears to be native in Indiana and Ohio, while the other is there only found in cultivation. Remarks were made by Professors Beal, Bastin and Claypole.

Prof. L. H. Pammel read a paper on "Pollination of the Genus *Æsculus.*"

Professor Campbell remarked on "Adventive Buds of *Lycopodium lucidulum*," on "The Archegonia of Ferns," and on "The Germination of the Spores and the Prothallia of *Osmunda.*"

The President appointed as a Committee on Nominations of Officers for the next meeting, Professor Wilson, Mr. Coville and Professor Spaulding.

MONDAY, AUGUST 25th.

Mr. F. V. Coville remarked on his descriptive list of the *Junci* of Texas; it includes seventeen species, one of which is Texan only, (*J. filipendulus*), fourteen range to the northeast and two are found in the Rocky Mountains. Mr. Coville also exhibited a serviceable collecting knife, the "cotton knife" of the South, which he especially recommended for the collection of subterranean parts of plants. Professor Beal spoke of the importance of the root-stocks of grasses as diagnostic characters, and remarked on their poor representation in herbaria.

Professor Arthur described several pieces of apparatus for the investigation of phenomena of vegetable physiology, illustrated by drawings. The subject was discussed by Professor McBride, Mr. W. H. Seaman, Professor Bessey and Professor Spaulding.

Mr. Coville reported on the progress of the Botanical Exchange Club under the direction of the Division of Botany of the United States Department of Agriculture, stating that some five thousand specimens are now in hand.

Professor Claypole read a paper on "Plant Colonists at Akron, Ohio," alluding to *Conium maculatum, Tragopogon porrifolius, Artemisia vulgaris* and *Cnicus arvensis*, both sterile and fertile plants of the latter being found, and *Lactuca Scariola.* Professor Burrill remarked on the scarcity of fertile plants of *Cnicus arvensis* in Illinois, and Dr. Britton stated that they were also rare in New Jersey and Southern New York. Professor Arthur reported that *Dysodia chrysanthemoides* and *Iva xanthiifolia* were steadily migrating eastward along the railroads. Dr. Britton reported *Leontodon hirtus* as recently found at several points in New Jersey and New York, and *Crepis pulchra* introduced along the railroad at Culpepper, Virginia. Both of these European species demand admission into our text-books of systematic botany. Mr. Blatchley stated that *Solanum rostratum* had been found in Indiana, an immigrant from the southwest. Fugitive specimens of the latter have also been picked up in New York and New Jersey.

In the afternoon the club enjoyed an excursion tendered by the Local Committee of Arrangements, to a series of ravines known as the "Shades of Death," situated about fifty miles from Indianapolis, and reached by the I., D. & W. R. R., which generously provided a special train for the transportation of the members. Despite the somewhat forbidding name of the locality it proved to be of much botanical interest, and a delightful trip was experienced. At an informal meeting on the grounds, the President appointed Professors Bastin, Wilson and Bessey a committee to draw suitable resolutions of thanks to the local committee and the superintendent of the I., D. and W. R. R.

TUESDAY, AUG. 26th.

Professor Halsted reported a double-flowered form of *Convolvulus sepium*, and a probable hybrid of *Tragopogon pratensis* × *T. porrifolius* from New Brunswick, N. J. He also stated that the pollen of *Epilobium palustre* var. *oliganthum* is interestingly different from that of any other species of the genus in having the four grains produced in each mother cell, remain united in a quadrate mass and are only separated by prolonged teasing. The individual grains are large, as they noticeably are in the genus, and the groups are therefore remarkably conspicuous. When taken from the stigma they usually exhibit tubes proceeding one from each of the four grains. That the plant common and that the quadrate pollen masses make fine objects for the microscope are the excuses for mentioning the peculiarity not often met with elsewhere. In this species it seems to be constant. In the absence of Prof. Halsted his communications were presented by the Secretary.

Professor McBride stated that he thought other species of *Epilobium* shared the same structure.

A paper by Miss E. Porter—"Notes on Spore Discharge of Ascomycetes," was read by the Secretary. It contained observations on this process in species of *Pleospora*.

Mr. H. L. Bolley read a paper on "Potatoe Scab a Bacterial Disease," illustrated by specimens and drawings. Prof. Burrill stated that the investigation conducted by Mr. Bolley would lead to some of the most valuable results reached for many years in the study of vegetable pathology.

The committee appointed to nominate officers for the next meeting of the club reported as follows:

President, Mr. Wm. M. Canby, of Wilmington, Del.

Vice-President, Prof. Lucien M. Underwood, of Syracuse, N. Y.

Secretary, Mr. B. D. Galloway, of Washington, D. C.

The nominees were unanimously elected.

The President then declared the club adjourned, to meet next year at Washington, D. C.

List of Botanical Papers Presented before the Section of Biology, Indianapolis Meeting A. A. A. S., August, 1890.

Forest Trees of Indiana, by Stanley Coulter.

Preliminary notes on a new and destructive Oat Disease, by B. T. Galloway.

Observations on the variability of disease-germs, by Theobald Smith.

The Trimorphism of *Uromyces Trifolii*, by J. K. Howell, presented by W. R. Dudley.

Observations on the life history of *Uncinula spiralis*, by B. T. Galloway.

On the seed coats of the genus *Euphorbia*, by L. H. Pammel.

Observations on the method of growth of the Prothallia of the Filicineæ, with reference to their relationships, by Douglas H. Campbell.

Development of the Sporocarp of *Griffithsia Bornetiana*, by V. M. Spalding.

Contributions to the life history of *Isoetes*, by Douglas H. Campbell.

The relation of the Mexican flora to that of the United States, by Sereno Watson.

The distribution of the North American *Umbelliferæ*, by John M. Coulter.

The distribution of Hepaticæ of North America, by Lucien M. Underwood.

The Migration of Weeds, by Byron D. Halsted.

Geographical distribution of North American Grasses, by W. J. Beal.

Geographical distribution of North American Cornaceæ, by John M. Coulter.

The general distribution of North American plants, by N. L. Britton.

Work of the Botanical Division of the Department of Agriculture, by F. V. Coville.

The continuity of protoplasm through the cell-walls of plants, by W. J. Beal and T. W. Tuomey.

The development and function of the so-called Cypress-"knees," with a consideration of the natural habitat of the tree, by W. P. Wilson.

Preliminary notes on the genus *Rynchospora* in North America, by N. L. Britton.

On *Rusbya*, a new genus of Vacciniaceæ from Bolivia, by N. L. Britton.

Notes on a monograph of the genus *Lechea*, by N. L. Britton.

The specific germ of the Carnation disease, by J. C. Arthur and H. L. Bolley.

Notes upon plants collected by Dr. Ed. Palmer at La Paz, Lower California, in 1890, by J. N. Rose, presented by John M. Coulter.

Notes upon the crystals in certain species of the Arum family, by W. R. Lazenby.

Notes on *Isopyrum biternatum*, by C. W. Hargitt.

Botanical Notes.

Tubular Flowers in Rudbeckia. I have lately had handed to me a flower of the *Rudbeckia hirta*, in which the rays instead of being flat are all tubular. The plant grows here in Concord, it had eight or ten flowers and all the rays were like the specimen given me. The tubular flowers were of the light color of the underside of the rays, while the opening at the end was bright yellow, a line or vein being on the centre of the upper side where the rolled rays seemed to join. The flower looked very much like the hub and spokes of a wheel. A. W. HOSMER.

Concord, Mass.

Progress at Brown University. Botany is looking up at Brown University. At its last meeting, the Corporation elected Mr. James L. Bennett Curator of the Herbaria, and Prof. H. C. Bumpus assistant in Biology. We have some hopes, too, of new and better accommodations for the herbaria and laboratory. We greatly desire to strengthen our present collections and to create an economic museum. In the hope that some friend may see this and aid us, I send you this brief note. Fruits, fibres, fabrics, drugs ; nothing vegetable will be alien to us. We ask the good will of the fraternity. W. W. BAILEY.

Reviews of Foreign Literature.

Conspectus Floræ Europaeæ. Supplementum II, Pars altera. C. F. Nyman. (8vo., pp. 225-404, Orebro, 1890).

This concluding part of a most extensive and important piece of work includes additions and emendations to the preceding pages, notes, observations and a complete index to the Supplement. It embraces the additional matter from Borragineæ to Pteridophyta. A very considerable number of species have been added to the Flora of Europe since the completion of the Conspectus. Localities for rare or critical species are cited in detail, and references given for descriptions of all the additional species. It would have been exceedingly interesting to have had a statement of the number of species recognized in the work, in order to compare it with those known from an equal area of America lying in the same latitudes.

Monographie der Gattung Orobanche. Dr. Gunther Ritter Beck von Mannagetta. (Bibliotheca Botanica, Heft 19).

This is an exhaustive monograph of these interesting root-parasites, including chapters on the history of the genus, its morphology, anatomy and physiology, the host-plants of the various species and their geographical distribution. Then follows the critical description of the eighty-three species recognized, nine of which are American, included in the subgenera Aphyllon, Myzorrhiza and Kopsiopsis. The first of these includes (1) *O. uniflora*, L. (*A. uniflorum*, Gray) and (2) *O. fasciculata* (Spreng.) Nutt. (*A. fasciculatum*, T. & G. The second (3) *O. Californica*, C. &. S. (*A. Californicum*, Gray); (4) *O. Grayana*, Beck (*A. comosum*, Gray; *O. comosa*, Hook. not Wallr.); (5) *O. Ludoviciana*, Nutt. (*A. Ludoviciana*, Gray) and under this *A. Cooperi*, Gray and *A. multiflora*, Nutt. are placed as varieties; (6) *O. Chilensis* (Phil.), Beck, the only South American species; (7) *O. bulbosa*, Beck (*A. tuberosum*, Gray, not *O. tuberosa*, Hook); (8) *O. pinorum*, Geyer (*A. pinetorum*, Gray) which Dr. Beck has not seen and regards as imperfectly described. The third subgenus includes (9) *O. Hookeri*, Beck, (*Boschniakia strobilacea*, Gray).

N. L. B.

Recherches expérimentales sur les Modifications des Feuilles chez *les Plantes maritimes;* par M. Pierre Lesage (Revue Génér. de Bot. Fev., Mars, April, '90).

This paper sets forth elaborate experiments on the variations of inland plants grown at the seashore. Ninety species taken from thirty-two orders were studied and three plants especially were cultivated, *Pisum sativum, Linum grandiflorum* and *Lepidium sativum.* The stated results of the experiments are here translated as closely as possible.

1st. Plants growing by the sea generally have thicker leaves than when they grow inland. All plants naturally do not follow this rule.

2d. In plants that most successfully submit to maritime influence, the palisade-cells are much developed. If the thickness of the leaf has notably increased, the palisades are much lengthened, at the same time the number of the mesophyll layers may augment or remain the same, according to the species. If the leaf keeps to more or less the same thickness in the different cases, the palisades are developed so that the relation of the palisadic tissue to the mesophyll is greatest at the seashore.

3d. The lacunæ are greatly reduced in plants of the seaboard.

4th. Chlorophyll tends to be less abundant in the cells of plants on the shore. This conclusion is less rigorous than the preceding ones. It cannot be verified well, except in plants stationed where they can be more or less inundated by the sea or where they can receive the salt mist from the waves in large quantities.

5th. The carnosity, the development of the palisades, the reduction of the lacunæ and the diminution of the chlorophyll can be obtained in experimental cultivation, where the variable element is salt. A. M. V.

Index to Recent American Botanical Literature.

Æsculus Parryi. C. S. S. (Garden & Forest, iii. 356, Fig. 47).

Apical growth in Roots of Marsilia quadrifolia and Equisetum arvense. Wm. M. Andrews (Bot. Gaz. xv. 174-177, illustrated).

Chestnut Tree—The. (Garden & Forest, iii. 353, 354, illustrated).

Clematis Fremontii. (Garden & Forest, iii. 380, fig. 49).

Cornaceæ—A Revision of North American. J. M. Coulter and W. H. Evans. (Bot. Gaz. xv. 30–38, 86–97 ; also reprinted).

In this revision the authors lay considerable stress upon the characters of the stones of the fruit as points of distinction, not only between species, but also between sections, in their arrangement of the genus *Cornus*. *C. Drummondii*, C. A. Meyer, is relegated to a variety of *C. asperifolia*, Michx. *C. Californica*, C. A. Meyer, is considered to be a variety of *C. pubescens*, Nutt. *C. candidissima*, Marsh. (1785), replaces *C. paniculata*, L'Her., (1788). *C. Greenei* is described as a new species founded on specimens furnished by Prof. E. L. Greene, from California. *C. Baileyi* is also named as a new species, from specimens collected about the Great Lakes and westward. The same species was distributed by Dr. Porter as *C. pubescens*, and has been confused with several other species. In regard to these the authors say : " *C. stolonifera*, *C. Baileyi* and *C. pubescens* form a very perplexing and apparently confluent group of species. In all probability they freely cross with one another, and some of the puzzling intermediate forms may be hybrids." The genus *Nyssa* is also arranged according to the characteristics of the fruit and their stones. Only four species are recognized.

Under the genus *Garrya*, *G. Lindheimeri*, Torr. becomes *G. ovata*, Benth. var. *Lindheimeri* ; *G. flavescens*, Watson, becomes *G. Veatchii*, Kellogg, var. *flavescens* and *G. flavescens*, var. *Palmeri*, Watson, becomes *G. Veatchii*, Kellogg. A. H.

Fungi in the Collection of the Association—List of Staten Island. Arthur Hollick & N. L. Britton. (Proc. Nat. Sci. Assn. S. I. Special No. 11, Aug., 1890).

This list of forty-two species of fungi was prepared from specimens collected on Staten Island by the members of the Natural Science Association and submitted to Mr. J. B. Ellis for determination. As might be expected, the species are such as are more or less conspicuous—thirteen of them being in the genus *Polyporus*. In regard to *P. rimosus*, Berk., Mr. Ellis says, in a foot-note: "Your specimen is the first I have seen from this region."

Goanese Ipecac. H. H. Rusby. (Reprint from Drug. Bull., July, 1890, illustrated).

Under this title is a description and plate of *Naregamia alata*, W. & A.

History of Garden Vegetables. E. L. Sturtevant. (Am. Nat. xxiv. 629-646).

This contribution to the subject contains notes on "Rocket Salad," (*Brassica eruca*); "Rosemary," (*Rosemarinus officinalis*); "Rue," (*Ruta graveolens*); "Ruta-baga," (*Brassica Napobrassica*); "Saffron," (*Crocus sativus*); "Sage," (*Salvia officinalis.*); "Salsify," (*Tragopogon porrifolius*); "Samphire," *Crithmum maritimum*); "Savory" (*Satureja* sp.); Savoy Cabbage, (*Brassica oleracea bullata*); Scarlet Runner Bean, (*Phaseolus multiflorus*); Scolymus, (*Scolymus Hispanicus*); Scorzonera (*Scorzonera Hispanica*); "Scurvy Grass," (*Cochlearia officinalis*, "Sea Kale," (*Crambe maritima*) and "Shallot," (*Allium ascalonicum*).

List of Plants collected by Dr. Edward Palmer, in 1888, *in Southern California.* Geo. Vasey and J. N. Rose (Contr. Nat. Herb., No. 1., 1-8).

An enumeration of two hundred and forty-seven species, many of them rare. No new species are described.

List of Plants collected by Dr. Edward Palmer, in 1889, *at Lagoon Head, Cedros Island, San Benito Island, Guadalupe Island and at the Head of the Gulf of California.* Geo. Vasey and J. N. Rose. (Contrib. Nat. Herb., No. 1, 9-28).

An enumeration of several hundred species including descriptions by Mr. Rose of new ones in the genera *Sisymbrium*, *Encelia*, *Phacelia*, *Nicotiana*, *Eschscholtzia*, *Sphæralcea* and *Hemizonia*, and *Euphorhia Pondii*, Millspaugh.

Mosses of Staten Island—Preliminary list of the. E. G. Britton. (Proc. Nat. Sci. Assn. S. I., Special No. 10, July, 1890).

In this list are enumerated five species and varieties of Sphagna and ninety-six Musci. In a brief head-note the author says that the specimens upon which the list is founded were collected during a period of about eight years, and it is to be considered as very nearly complete, but additions may be looked for in the genera *Bryum*, *Barbula* and *Orthotrichum*.

Native Shrubs of California—IV. E. L. Greene. (Garden and Forest, iii. 378, 379).

Interesting memoranda upon four species of *Lavatera* are given under this heading, the first one of which, (*L. assurgentiflora*), is the only species inhabiting the main land. Of the other three each one inhabits an island of its own off the coast of Lower California. *L. venosa* is confined to the island of San Benito, *L. insularis* to Coronado Island and *L. occidentalis* to Guadalupe.

Notes on North American Trees.—XX. C. S. Sargent. (Garden and Forest, iii. 355–356).

Description of the wood of the following species are given: *Terminalia Buceras, Quercus tomentella, Cupressus MacNabiana, Picea Breweriana* and *Larix Lyallii.*

Osservazioni sulla Mina lobata. G. E. Mattei. (Nuevo Giorn. Bot. Ital. xxii. 290).

Pitcher Plants. Sophie B. Herrick. (The Great Divide, iii. 74, 75).

The editors of the "Great Divide" are evidently not botanists, or else they presume upon not having botanists on their list of subscribers, otherwise this extraordinary article could certainly not have appeared. The text is written in the usual style of a popular treatise and contains but little information that is deceptive. In the illustrations, however, a *Cephalotus* is boldly called *Sarracenia variolaris*, a *Nepenthes* is labelled *Darlingtonia Californica*, and a *Darlingtonia* is named *Sarracenia purpurea.* There is also a figure of *Utricularia* which, as the name is suggested, might be recognized for a member of that genus.

Plant Diseases—On the Nature of Certain. A. L. Kean. (Bot. Gaz. xv. 171–174).

Plant Notes. E. J. Hill. (Garden and Forest, iii. 370).

Memoranda upon *Hypericum Kalmianun* and *Lobelia Kalmii.*

Ramularia on Cotton—A New. Geo. F. Atkinson. (Bot. Gaz. xv. 166–168, illustrated).

Ramularia areola is described and figured as new.

Schubertia grandiflora, Mart. and Zucc. S. W. (Garden and Forest, iii. 368, fig. 48).

Tecoma radicans. W. Goldring. (Garden, xxxviii. 51, illustrated).

Upon a Collection of Plants made by Mr. G. C. Nealley in the region of the Rio Grande in Texas, from Brazos Santiago to El Paso County. John M. Coulter. (Contrib. Nat. Herb. No. 2, pp. 65, Washington, 1890).

Mr. Nealley has been employed by Dr. Vasey for several years in the collection of the plants of southwestern Texas. He has succeeded in finding many of the rarer species, not obtained since the time of the Mexican Boundary Survey, and in addition to this has discovered a considerable number of undescribed species. Among the most interesting of the plants enumerated by Professor Coulter, are *Castalia elegans*, found in considerable abundance in a new locality. *Castalia flava*, to which is doubtfully referred all the Texano-Mexican yellow water-lily specimens, including Bourgeau's No. 4, from Santa Anita, and Pringle's No. 1,956, from Brownsville, distributed as *Nymphæa Mexicana ; Thelypodium Vaseyi*, n. sp., *Abutilon Nealleyi*, n. sp., *Sphæralcea subhastata*, n. sp., *Cardiospermum molle*, and *Desmodium spirale*, new to the United States, *Pithecolobium Texense*, n. sp., *Gaura Nealleyi*, n. sp., *Turnera diffusa*, var. *aphrodisiaca*, new to the United States, *Aplopappus Nealleyi* and *A. Texense*, n. sp., *Viguiera longipes*, n. sp., *Perityle Vaseyi*, n. sp., *Ipomœa Nealleyi*, and *I. Texana*, n. sp., *Eriogonum Nealleyi*, n. sp. and *Euphorbia Vaseyi*, n. sp. The Juncaceæ and Cyperaceæ, named by Mr. Coville, include several species heretofore only sparingly collected. Dr. Vasey enumerates the Gramineæ and describes the following new species: *Panicum capillarioides*, *Muhlenbergia Lemmoni*, Scribn., *Sporobolus Nealleyi* and *S. Texanus ; Trisetum Hallii*, Scribn., *Bouteloua breviseta*, *Triodia eragrostoides*, Vasey and Scribn.; *T. grandiflora* and *Poa Texana*. The Pteridophyta were named by Mr. Henry E. Seaton, *Notholæna Nealleyi*, being described as new.

Altogether this is the most valuable and interesting collection recently made in the United States, and a very satisfactory result of the work of the Division of Botany in exploration. The original specific names of the plants enumerated, have been retained in many instances. We wish that this had been uniformly carried out, and the parenthetic citation of authors employed.

N. L. B.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVII.] New York, October 9, 1890. [No. 10.

Notes on the Manner of Growth of the Cell Wall.

BY EMILY L. GREGORY.

(Plate CIX).

The question of the manner of growth of the cell wall in the vegetable kingdom has not yet been satisfactorily answered. If we accept the theory of Nægeli in respect to the crystalline form of the micellæ composing it, and suppose the first or primary wall to be formed according to the laws governing the arrangement of such figures, when lying free in a fluid substance, the question then arises, how does this wall grow in surface and in thickness? Nægeli says in his work on the growth of the starch grain, that before this question can be answered many facts must be observed and registered.

The object of the present brief paper is to record one or two facts which appear to be connected with this question. It is not expedient therefore to give a resumé of the work already done and the facts discovered in this field since the suggestion of Nægeli. An article written by Krabbe in Pringsheim's Jahrbuch in 1887 contains an account of some very interesting observations and experiments, and in this paper the author claims to have proven one or two points in this connection which have hitherto lacked positive demonstration. Without taking space here to review this whole article, which is a long and valuable contribution to the literature on this subject, I may be pardoned for repeating some parts of it here.

In the study of stratification and striation in the walls of bast and thick-walled libriform cells, Krabbe claims that the observations preceding his own have been made on longitudinal sections, and therefore the results are not always reliable.

A stratified wall consists of several layers which appear to be quite distinct from each other when seen on the cross-section. These layers often appear striated, or as having stripings running more or less obliquely through them which on the cross-section show like narrow lines. Krabbe used cross-sections of different stems, *Linum*, *Urtica* and others, and by an ingenious method of focusing by which the lines, according to their relative position in the layer, were made to recede from or approach each other, claims to have proven that the process of intussusception could not have taken place in the growth in thickness of the entire wall. That is, he claims to have shown that the growth in thickness of each one of these lamellæ or layers was entirely separate from that of the others, and that no interchange of micellæ from one layer to another could have taken place.

The result of this study, ingenious as it was, led to no definite results as to the actual manner of increase of thickness in a wall already formed. Admitting that the two lamellæ are entirely independent of each other, each containing its own micellæ from the first, the question still remains, how did they reach their present thickness? He agrees with all the recent investigators on this subject, that in many cases a so-called new formation of wall occurs. To explain this we will suppose a cell with moderately thickened walls; this when about to add to its thickness throws out a new wall which eventually sets itself firmly on the old one so as to become part and parcel of it. This building a new wall by the protoplasm of an already enclosed cell is a process quite lately discovered and in German is known as "neubildung."

In another portion of his work he claims to have reached more satisfactory results; in fact to have actually proven that intussusception does take place in the increase of thickness in certain walls. In certain plants of the families Asclepiadaceæ and Apocynaceæ there occurs a process of widening or bulging out of the walls of the bast cells in a very singular fashion, and afterward a cellulose wall may be built across so as to form separate cells in the once single bast fiber. Now as to the growth of these widenings it is plain that the number of micellæ composing the growing cell wall must have increased considerably. The question how this increase is managed Krabbe answers by saying that it can be in no other way than by intussusception. He gives elaborate arguments to prove that the turgor could not be sufficient to account for it on the principal of stretching, says that a pressure of from 3,750 to 5,000 atmospheres must be assumed in order to produce such a result, and that it is impossible to premise a pressure of more than 1,000 atmospheres in a cell. Other serious objections are given, and finally, because Strasburger denies that a cell can grow in surface by any other process than by stretching, he says, admitting it to have grown by stretching, we must then expect it to be proportionately thinner, but such is not the case. Measurements are given showing the wall to be of uniform thickness. Therefore it is proven that these local thickenings in the bast cells of these plants must be the result of the process of intussusception.

Then he gives his reasons for concluding that in most cases of thickened walls showing striation the process of new formation has taken place, a wall being built and then added to the previous one. He says, admitting this latter statement proven, "Still the real question is not touched, for who can say how this new wall increased in thickness in its process of growth, whether by apposition or intussusception." In the case of the growth of the widened places in the bast fibers, however, a definite point is gained; if the proofs are satisfactory then we may hold that the theory of growth in thickness by intussusception in some cases is established.

While the writer was studying the development of wings on the stems of the genus *Euonymus* one or two instances of peculiar growth were noticed. About eighteen different species or varieties of this genus were studied, but only one of them showed this peculiarity in wall formation. This was *Euonymus angustifolia*, var. *purpurea*; the specimens were obtained from the nursery of Thomas Meehan, near Philadelphia. This species has the usual four-angled stem with slight but perfectly developed wings along these angles. It will be necessary here to repeat a little from the work on cork wings referred to above: "A cross-section at the distance of ½ centimeter from the growing tip of stem shows the tissues of the rind in a formative stage. The outer wall of the epidermal cells is covered by a thin cuticle, the cells themselves are large, nearly isodiametric, and with thin walls; below the epidermis are two layers of thin-walled cells without chlorophyll, then four or five layers of parenchymatic chlorophyll-holding cells, and then below these again several layers of colorless cells." At the corners of the stem the rows of chlorophyll-holding cells are broken by a cluster of collenchymatic colorless cells. In a later stage of development the central cells of this cluster form the string of bast fibers which are pushed out by the growing wing. It is with the growth and development of these bast fibers that a point of interest occurs. A section cut at the distance of ½ centimeter from the growing tip (Plate CIX. fig. 1.) shows this little central cluster of cells, with thick walls and small lumen; now a section at three centimeters from the tip shows that several important changes have occurred. The two cylinders of colorless cells now begin to take on a collenchymatic appearance, the walls having thickened considerably. The cells of the epidermis are in a state of rapid growth and division, new cells being added to the outer cylinder whose walls rapidly thicken, as may be seen by sections at the distance of five and seven centimeters from the tip. The cells in the center of the group in the corners are seen to have increased in diameter while at the same time their walls are much thinner.

Now if we follow this same set of cells, cutting at various distances below this, we find them with extremely thick walls, so that only a small point appears as the lumen. Their diameter is about the same as at the distance of three centimeters, but in whatever way the additional thickness has been acquired the original wall as seen at the latter distance is perfectly evident as a dark line marking the outline of each cell.

Here, if we accept Strasburger's theory, that growth in surface takes place by stretching, we have an apparently consistent explanation of the processes which have taken place. The thick walled cells in fig. 1 c., have changed to thin-walled wider lumened cells as seen in fig. 2, by using up the material already in their walls. By this process of stretching the diameter is increased until the proper size for the bast fibre is obtained. Then by a succeeding process this thin wall is added to until hardly a trace of cavity remains. If, on the other hand, as in the case of the bast fibres described by Krabbe, it can be proven that the turgor cannot be raised sufficiently to produce this effect of stretching, the only other explanation possible is that the walls of the cells in question have undergone the following cycle of changes: Their thin walls produced by the original division of the cells composing them have been thickened so they have the appearance as shown in fig. 1; then the matter composing these walls has been partially absorbed till only the light wall remains as seen in figure 2; this must also have increased in surface to allow for the increased diameter as seen here. Then later on a new process of thickening has taken place, by which the wall is made much thicker then before. It must be noticed here that there is not the same difficulty in the way of the wall stretching out till the diameter required is reached as in the case described by Krabbe. Here the young walls are in their early stage of growth and there is every probability that a much smaller pressure would serve to extend them than in case of the bast fibers of an older tissue.

It is true that the simple fact that one explanation appears more plausible than another, is not at all of the nature of proof in scientific research. At the same time the rapid succession of changes noticed in the thickness of the walls of this tissue seems worthy of record as a fact bearing on this subject.

Another peculiarity still more striking than this occurs in the course of the rapid growth and division of the epidermal cells between the wings. As before stated, these originate from a phellogen layer extending not around the stem, but only for a short distance around and beyond the little cluster of bast cells, the wing shoving these out as it develops. In this variety the wing never acquires a very great depth, but is of width enough to materially aid in the enlargement of the circumference, while the spaces between are thus enabled to assimilate. It is only, therefore, on the spaces between these wings that the epidermal cells retain their character and divide, forming new ones. This process does not result in the formation of corky layers, composing the tissue known as periderm, but they form an additional support to the outer collenchymatic cylinder, which at first is only two layers in thickness. By means of these additional cells the number is increased often to six or seven layers. In regard to these collenchymatic layers being necessary to support the stem, it may be mentioned in passing that this stem is one of the class having no bast fibers in its outer or rind portion.

The real periderm consists of the wings until the stem gets older—two or three years in some instances—when the assimilating surface is no longer needed, the bands of phellogen cells extend themselves until a circle is formed around the entire stem.

Now it is with the stem before the wings form and for some time after this, that we have to do. In order to allow the cells under the epidermis to fulfill their office of assimilating, the epidermal cells themselves must remain intact and perform their office as do the epidermal cells of the leaf. It is necessary, therefore, that they divide and increase rapidly in order to keep pace with the increasing growth in diameter. This in itself presents no difficulty as long as the cell contents are in working order and the cell wall is of pure cellulose, so that it can change in any way to enable it to increase in thickness or in surface ; this process of growth and cell division is normal to the plant.

There is, however, one difficulty in this for the epidermal cells, which is not found usually elsewhere. This is the heavy upper or outside wall, the cellulose of which turns to suberin or cutin at a very early stage of the growth of the stem. One of the characteristics of suberin is that it is nearly impervious to air. It is also supposed to be much less liable to change of structure than cellulose. By this is meant that the micellæ composing it do not so readily change place, therefore change in form or structure is more difficult in case of suberized wall than that consisting of pure cellulose. In other words a cell with purely cellulose wall with living contents is always liable to changes by means of growth, while the wall turned to suberin or lignin is a sign of completed growth, fixedness of form.

Now in our *Euonymus* stem at a distance of one-half centimeter from the tip these epidermal cells are found partly suberized as to their upper wall, this wall is thicker than the other, but the shape of the cell is nearly cubical. At a distance of three centimeters from the tip and from this on till the stem has acquired some age, the outer walls of the epidermal cells are very thick and strongly cuticularized. Instead of stretching across the cell at right angles with the radial walls, and parallel with the lower tangential walls, they are strongly inclined upward, many making a sharp angle. Here, where the wall is so plainly cuticularized, the process of division is rapidly going on; new walls are seen in both directions, tangential and radial. But, as before stated, the tangential divisions are limited for the most part to four or five layers of cells, forming the collenchymatic cylinder outside the palisade cells. The radial divisions, of course, keep pace with the increasing circumference, and the outer tangential wall must increase at a rapid rate; it must increase not only in surface, but it does keep pace in thickness, for no section can be made which does not show all the cells of the epidermis fitted with outer walls of uniform thickness.

Now if we turn to the sections studied, we shall see a peculiar development which must in some way serve to aid in this series of rapid changes. We have before mentioned a curvature in the wall in nearly all cells in the process of division (which process is detected by the thinness of the new wall). Besides the thin new wall just forming, there is another element which, so far as I know, is peculiar to this variety. This is a sphere or spherical body consisting of partly cuticularized cellulose, extending from the outer wall down into the cell, to which in all cases is attached the new wall. That is to say, this spherical body projecting down into the cell was never found unless below it was the new radial wall which was just forming to increase the number of cells in the circumference. New cells were sometimes seen without the sphere, but the sphere is never found without the wall. Now by a study of the surface of these cells the following facts are recognized:

These spheres are found principally or more frequently on the tangential walls of the grown epidermal cells. At the stage where they are most numerous, these cells have a long diameter parallel with the axis of the stem. The tangential diameter is the one which must enlarge so rapidly to keep pace with the increase in circumference, and these bodies occupy such a position as to be readily made use of in the new outer wall.

If we suppose this to be the function of these bodies, the question at once arises. By what process is their substance taken up into the wall? There is little probability that the latter stretches out so as to use up this material, as in the case of the cellulose ring in the *Œdogonium* cell. The shape is not adapted to this purpose, therefore a process similar to that of intussusception must take place. The assumption that this is the function of these globular bodies, and that they are merely reserve stores enabling the outer wall of the epidermis to preserve its uniform thickness, we admit, rests on very slight proofs. There are, however, several indications which point in this direction.

Chemically, they agree perfectly with the outer wall from which they extend. The greater portion of this wall consists of cutin in its early stages, a layer of pure cellulose is found to extend along the inner surface connecting with the side walls, and this cellulose extends entirely around the sphere. In fact, it is as though a little bag of cellulose membrane were sunken in here and filled with cuticularized substance. There is no question as to its chemical nature, as it was repeatedly and thoroughly tested. Again its connection with the new young wall is suggestive of this function. Except for this, its appearance is quite similar to the incrustations of calcium carbonate sometimes found in the epidermal cells of *Ficus*.* However, cystoliths do not occupy such a position in reference to new walls, neither do they consist of cuticularized cellulose. Another reason for the assumption is the lack of these bodies in the epidermis of the grown stem, or that portion where the new periderm is about to form and the epidermis is to be thrown off.

EXPLANATION OF PLATE CIX.

Figures 1, 2 and 3 represent cross-sections of stem of *Euonymus angustifolia*, var. *purpurea*. They include only a corner in each instance, containing a bundle of bast cells, which appears in fig. 3 in a mature or finished condition.

Fig. 1 shows a section cut one-half centimeter below the tip of the stem, fig. 2 three centimeters, and fig. 3 twenty-five centimeters from this tip. In each of these figures *a* marks epidermal tissue, *b* the subepidermal or supporting-cells, and *d* those holding chlorophyll.

In fig. 1, *c* marks the collenchymatic cells of the corner, which later on develop into bast fibers. In fig. 2, these cells *c* are thin-walled, and have a larger lumen. In fig. 3 the same letter marks the cluster now completed.

Fig. 4 represents the epidermal layer as seen from above—distance from tip of

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*See Haberlandt Physiologische Pflanzen Anatomie, page 340.

FIG. 1.

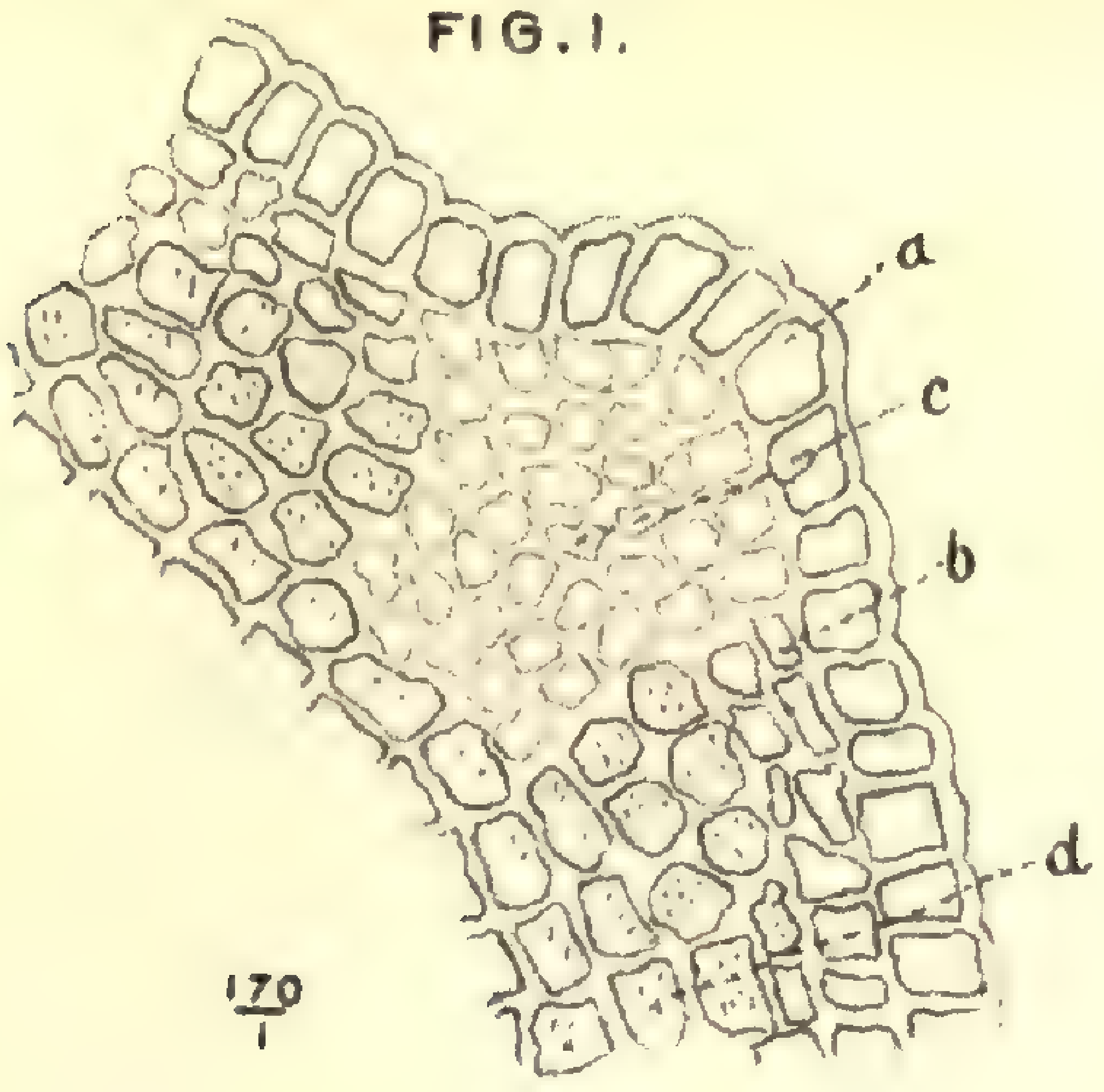


FIG. 2.

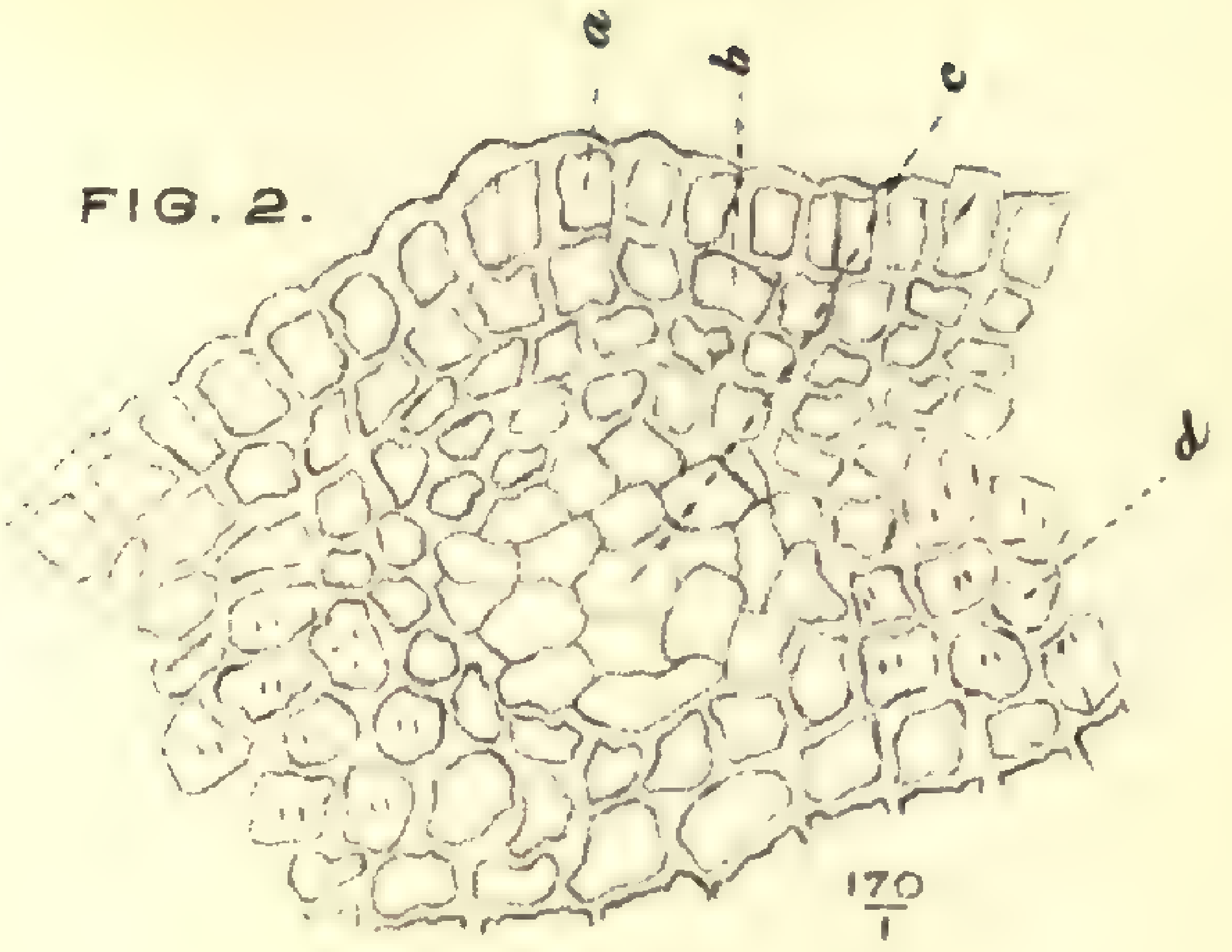


FIG. 3.

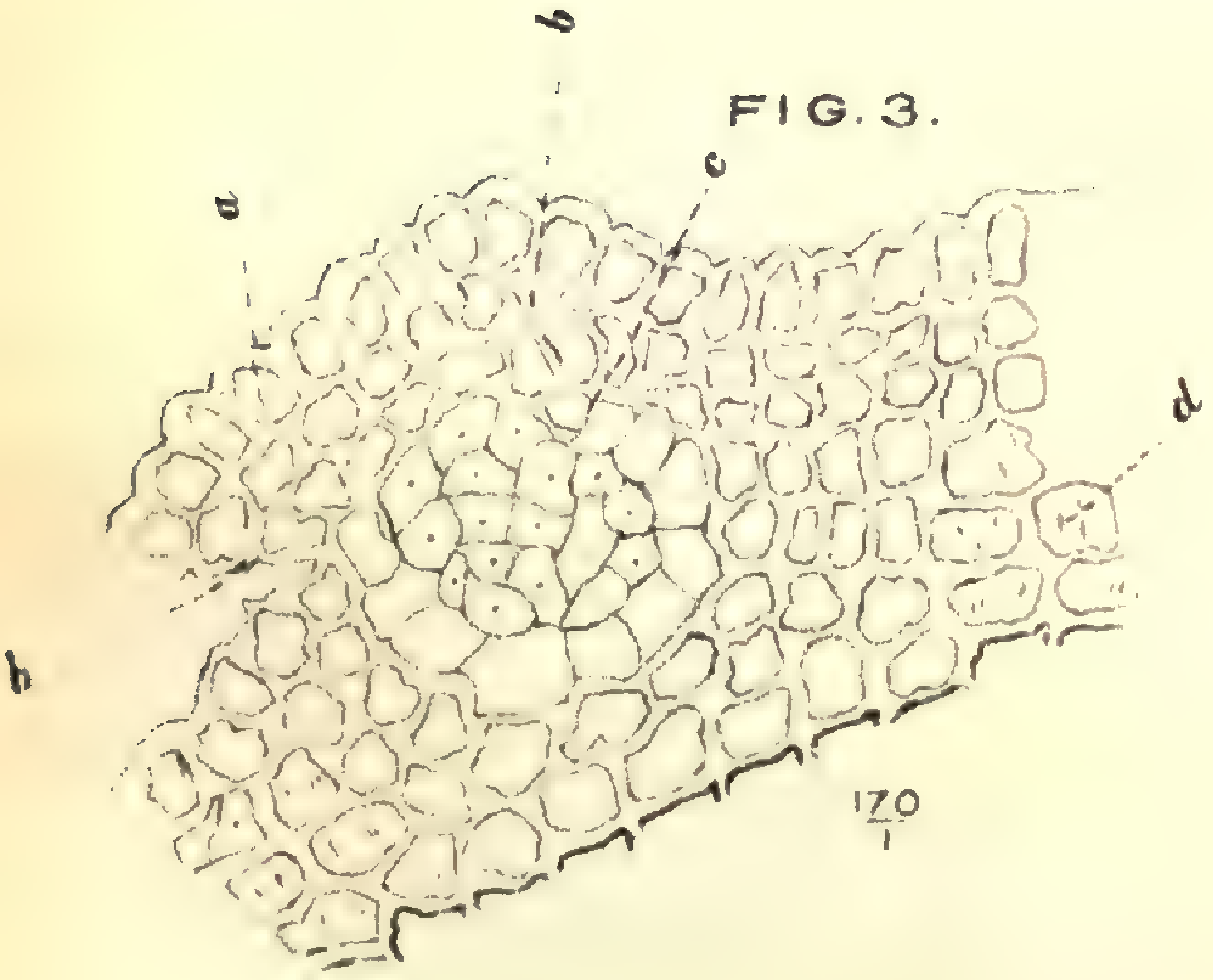


FIG. 4.

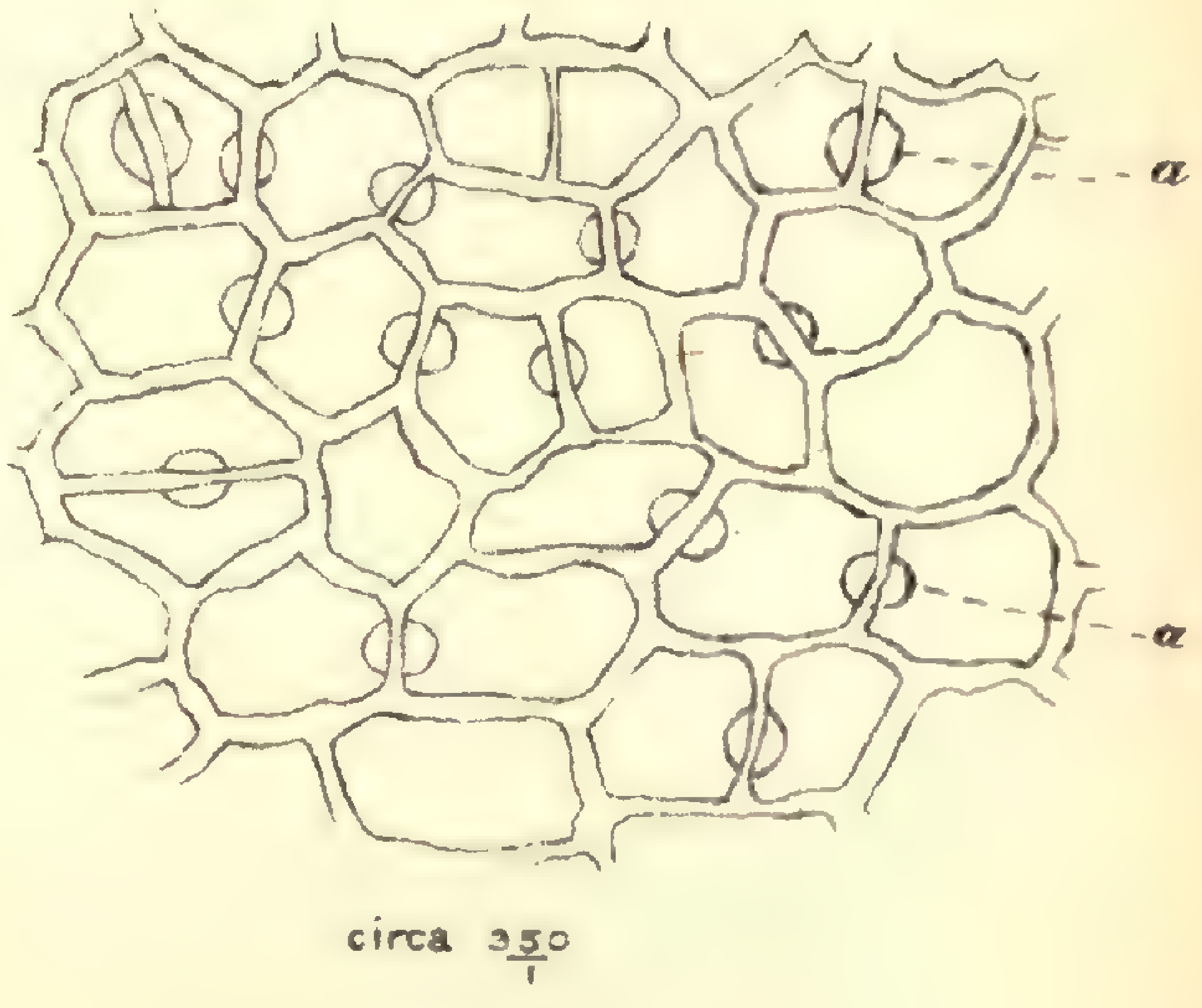


FIG. 5.

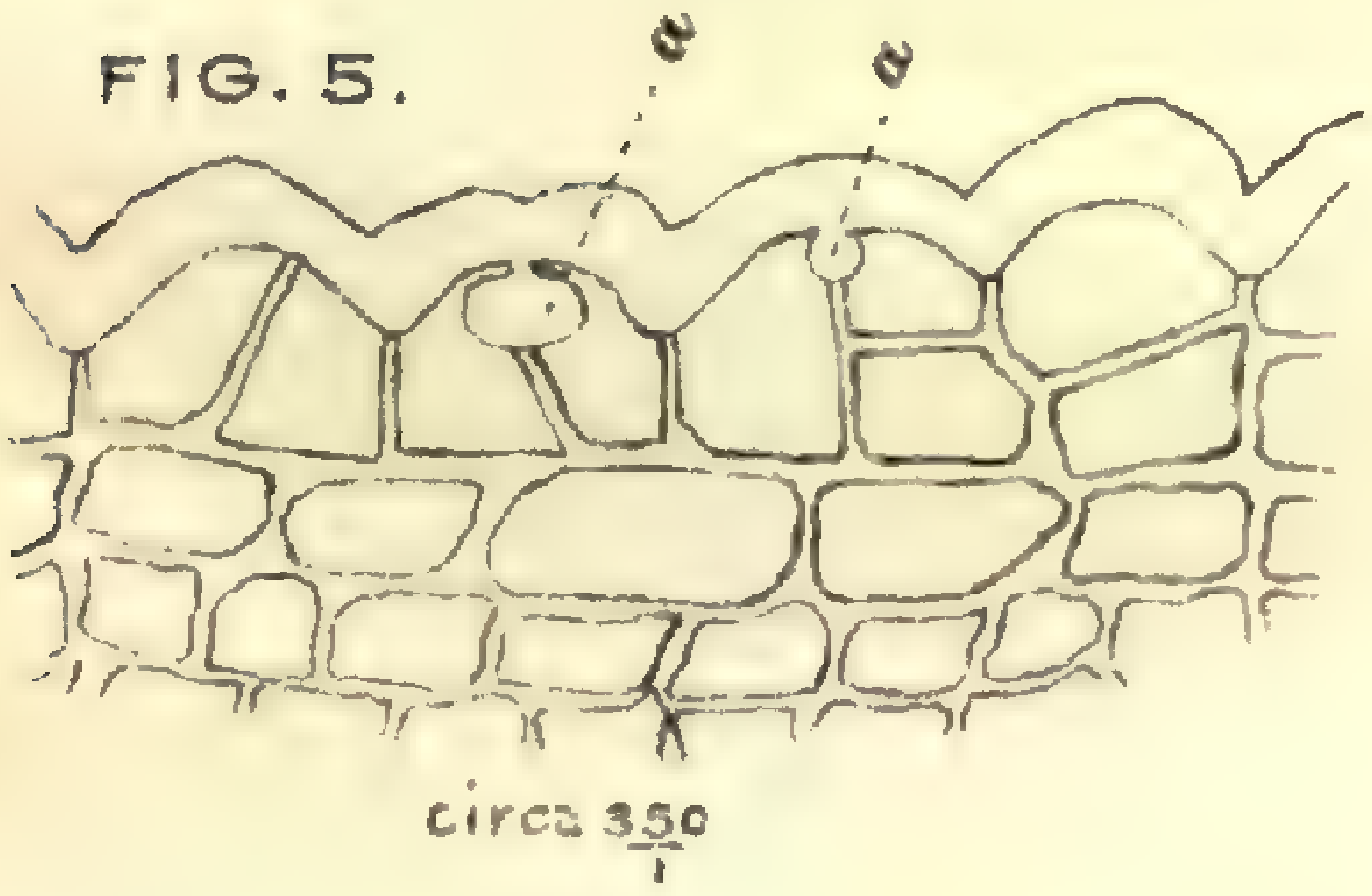


FIG. 6.

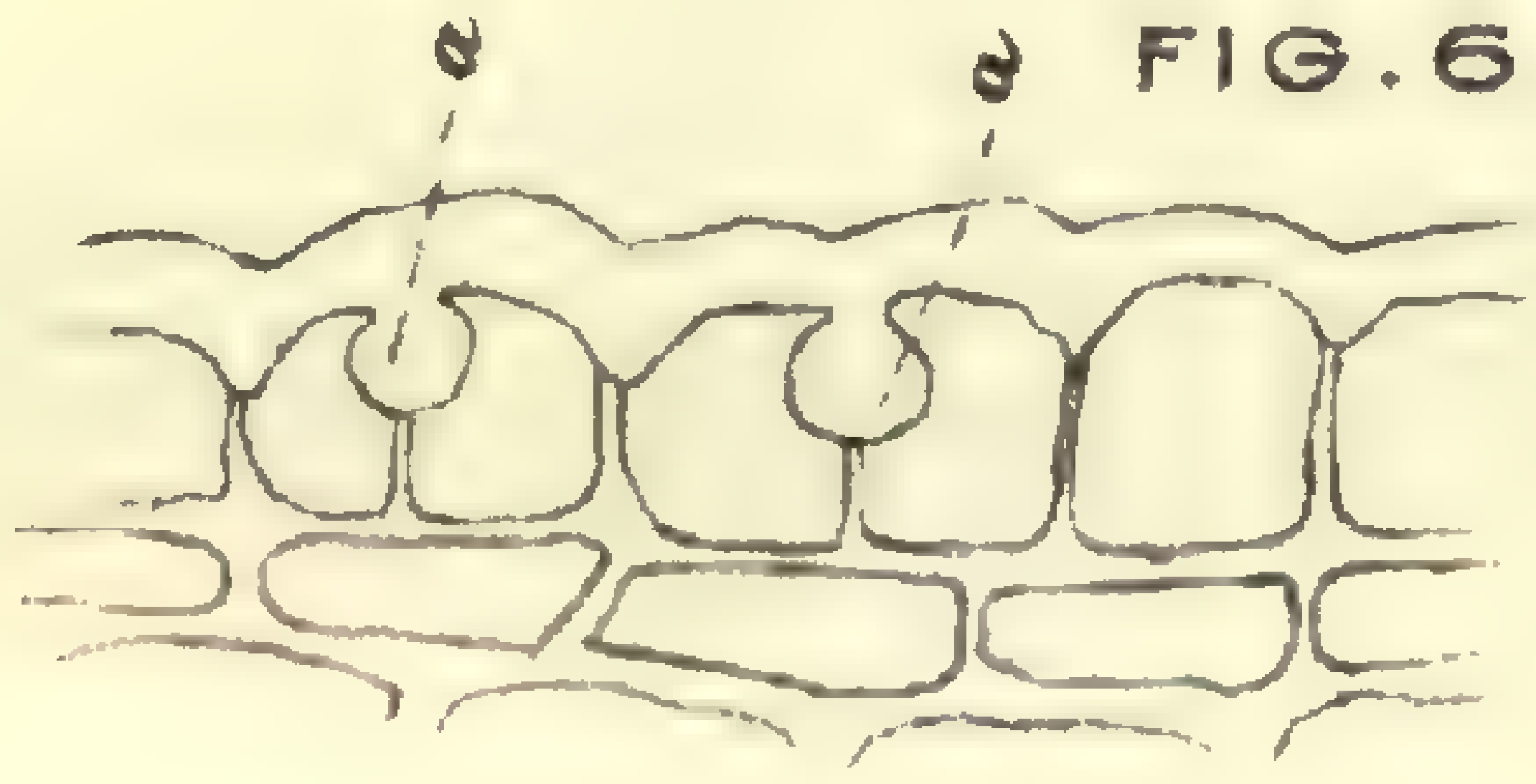
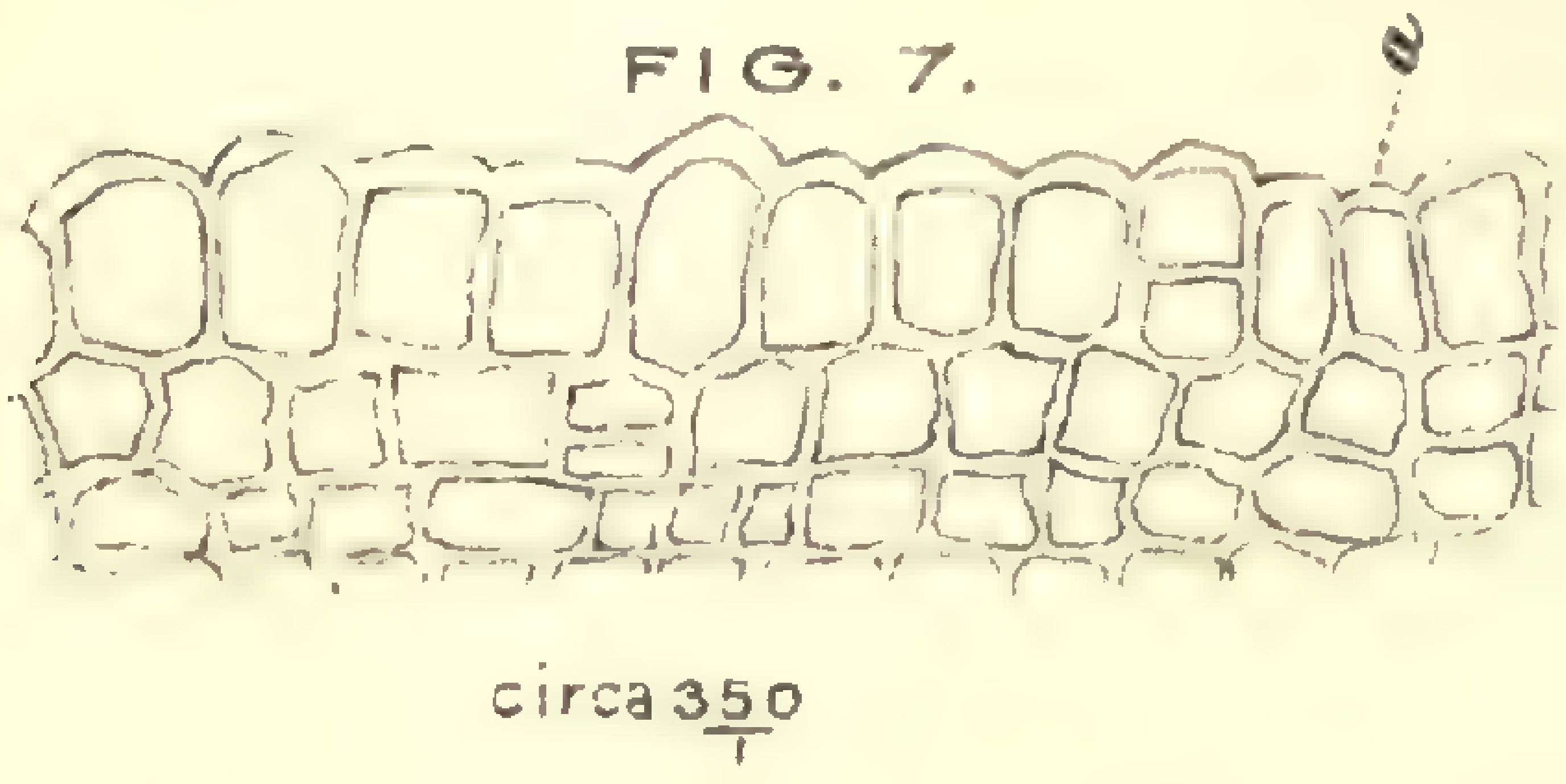


FIG. 7.



GREGORY ON THE MANNER OF GROWTH OF THE CELL-WALL.

stem about twenty-five centimeters: *a* marks the spherical projection into the cells.

Fig. 5 shows cross-section through epidermal and subepidermal layers at the same distance from tip as in fig. 4; *a* shows here the spherical projection.

Fig. 6.—Same as fig. 5, only a longitudinal section.

Fig. 7.—Cross-section showing epidermal cells, cut one-half centimeter from tip; *a* here shows beginning of a stoma.

A Further Enumeration of some Lichens of the United States.

BY DR. JOHN W. ECKFELDT.

The following account includes a few lichens heretofore but little known as occurring within the limits of the United States, and as two of these species have been described elsewhere, and as they are comparatively new or uncommon to the region specified, I deem it wise to call further attention to them. It will be further noticed that I have included three new species; these were collected during the winter of 1887, and were kindly identified by Dr. W. Nylander, whose descriptions I here include. Formerly the other plants were recorded as occurring only in the island of Cuba.

Lecidea (Biatora) mesophœa, Nyl. spec. nova. Thallus cinerascens vel cinereo-virescens, subleprosus, tenuis, indeterminatus; apothecia livido-nigricantia (latit circiter 0.5 millim.), lecanoroidea obmarginem conceptacularem albicantem (vix prominulum), intus strato media obscurato; sporæ 8-næ, fusiformes, 3-septatæ, longit 0.011-15, crassit 0.004 millim., epithecium incolor, paraphyses non discretæ, hypothecium supra fuscum infraque incolor. Iodo gelatina hymenialis cœruliscent, dein fulvo rubescens.

Species videtur e stirpe *Lecidia* (*Biat. violaceæ* ab. omnibus distincta apotheciis intus albis striato hypotheciali superiori infuscato. Tuckerman in hb. eam dexit *Platygrapham* et adert quædam facies *Platygraphæ prominulæ*, Nyl. Enumer. p. 131 Guyanensis quae vero distat hypothecio fusco et alus notis varus.

A rather rare and well marked species found throughout Florida, but recently collected at Jacksonville on barks at the base of various trees, by Mr. Calkins. This plant evidently belongs to the more tropical regions of America, and may be found by careful search in the island of Cuba.

Lecidea (Biatora) orphnœa, Tuck. Proceed. 1864 p. 274. Tuck. synop. pars. 2, p. 157. Thallus obscure rufescens, minute granulosus, sub. furfuraceus; apothecia fusca planiuscula marginata aut demum convexiuscula immarginata (latet fere 0.25 millim.), intus obscura; sporæ 8-16-næ. incolores oblongæ simplices, long 0.005-9 crass. 0.002 millim.; epithecium incolor, hypothecium fuscum. Iodo gelatina hymenialis fulvo-rubescens (præcedente cœrulescentia). Species satis distincta in stirpe *L.* (*Biatora*) *furfuraceæ*, Pers.

Tuckerman refers to this plant as occurring on trees in Cuba, and collected there by Mr. C. Wright. We have been able to place this rare plant among the flora of North America. It was found during the winter of 1887 on the bark of *Ilex Cassine* by Mr. Calkins, and from the material submitted to me, I was led to suppose that it was heretofore unobserved.

LECIDIA (BIATORA) MILLEGRANA, (Tayl.) sub. LECANORA, Nyl. N. Gran. p. 64; LECANORA PYRRHITIS, Tuck.

Another species peculiar to Cuba as referred to by Tuckerman, and found at Jacksonville on the bark of various trees. A well-marked and exceedingly interesting species also of subtropical distribution.

ARTHONIA CINEREOPRUINOSA, Schær. Sporæ 3-4-septatæ, long. 0.011-15, crass, 0.0035-45 millim, spermatia recta, long. 0.004-5, crassit 0.0006 millim. Iodo gelatina hymenialis dilute coerulescens, dein fulvo-rubescens.

This lichen was found in small quantities, but in sufficient amount to clearly and accurately determine the species. It occurred at Jacksonville and Palatka on smooth bark of *Ilex Cassine.*

ARTHONIA PALMICOLA, Ach. Syn. p. 5. Est quasi *A. epipastoides*, Nyl. sporis minoribus, 1 long., 0.011-14, crass. 0.004-5 millim.

Under the latter name Mr. Willey says the plant occurs in the Atlantic States. I have received it from Jacksonville, where it appears to be quite a common species.

GRAPHIS VIRGINALIS, Tuck. Similis *Ferrurinæ sub-nitidæ*, Nyl. Fueg. Patag. p. 34, sed sporis intus minus loculosis; long. 0.025-34 crass. 0.012-17 millim., et iodo coerulescenti obscuratæ.

Found on smooth barks in the low country of Florida, and heretofore not in any recent list of lichens from that section of North America. This plant belongs more properly to the tropical Graphids.

GRAPHIS VIRGINEA, Esch. Sporæ long. 0,050-75, crass. 0.016-18 millim. Iodo coerulescentes et simul thalamium coerulescens.

GRAPHIS VIRGINEA, Esch. var. FULVESCENS, Tuck. (*G. scalpturata*, var. *fulvescens*, Tuck, hb.) Apotheciis hiascentibus, demum planis, testaceo-pallescentibus.

OBS. *Graphis subvirginea*, Nyl., est *Gr. virginiæ*, Mont., quœ non est *Gr. virginea*, Eschw.

This lichen occurs throughout the northern portion of the United States, and has been distributed under the name of *G. scalpturata*. It occurs in Florida about Jacksonville on *Ilex Cassine*.

GRAPHIS SUBFULGURATA, Nyl., spec. nova. Thallus macula pallida indicatus; apothecia obducta vel subobducta, gracilia, flexuosa et ramosa, epithecio angusto; sporæ 8-næ, fuscæ, oblongæ, quadri loculares aut triseptatæ, long. 0.018-21, crass. 0.006-8 millim. (Iodo non tinctæ); hypothecium incolor.

Forsan et *Ferrurina* consideranda; accedere tamen videtur versus *Gr. fulguratam* Fee, cui sporæ minores 1 long, 0.011-15 crassit. fere 0.007 millim. A lichen having given much doubt as to its identity may now be placed here as a well authenticated species.

This lichen, not observed by all collectors, however, abounds throughout Florida, and has been more frequently observed in the neighborhood of Jacksonville. The specimens that I had were collected by Mr. Calkins.

PYRENULA SUBPUNCTIFORMIS, Nyl., nova spec. Sat similis *P. punctiformis*, Ach., at sporis triseptatis et nonnihil majoribus, long. 0.018-22 crass. 0.006 millim.

A not uncommon species, frequently found associated on the same bark with *P. punctiformis* and other *Pyrenulæ* and probably mistaken for *P. fallaciosa*, Stitz.

Notes on Asplenium pinnatifidum, Nutt.

So remarkable have been the discoveries of *Asplenium pinnatifidum*, Nutt., in Lancaster Co., Pa., during the present season, that a few notes concerning it seem to be worth recording. *A. pinnatifidum*, Nutt., was first discovered in this county by Prof. T. C. Porter, June 14th, 1864, near Georgetown, and afterwards on the Tucquan Creek several miles from its mouth. In 1868 at a point on the Octoraro Creek, near Nine Points, it was collected by Dr. A. P. Garber. On the 1st of April last, while botanizing along the Pequea Creek with my friend, Mr. A. A. Heller, I collected this rare and beautiful fern for the first time. Since then I have collected it at four new stations, at two of which it is quite rare, while at the other two stations it is remarkably plentiful.

On May 21st, in a deep and wild ravine near Smithville, which was never explored, I found great quantities of *A. pinnatifidum*, Nutt. growing in the crevices of the high cliffs. Then on June 26th, while collecting along the Susquehanna several miles above Safe Harbor, in a very rocky ravine, I unexpectedly came upon it. Both here and at Smithville there is one spot where a peculiar form grows. The frond is two to three times broader in proportion to the length than in the common form, and regularly divided to the rachis almost to the apex, the pinnæ being ovate in outline. I started out on July 21st to collect specimens at the stations given by Prof. Porter and Dr. Garber. Somehow I failed to find either, but discovered a new station on the cliffs of the Octoraro about three miles east of Prof. Porter's locality and several miles west of that of Dr. Garber. The last station at which I have collected it is on the rocks at the mouth of the Tucquan Creek. At the localities where it grows so plentifully it varies much both in size and form. The fronds vary in length from two to twelve inches, and in width from one-half to two inches. Many of my specimens have long, sharp lobes at the base of the frond, and in some they run all the way up to the apex, instead of the usual rounded lobes. One very fine specimen, three of whose fronds are almost one foot long, has one frond taking root at the apex, which gives rise to four small fronds.

JOHN K. SMALL.

Lancaster, Pa.

A new North American Lejeunea.

BY LUCIEN M. UNDERWOOD.

Among the extensive hepatic collections made by Professor John Macoun in British Columbia during 1889–'90, a single *Lejeunea* occurred, which was referred to Dr. Spruce, who has sent the following description and notes. It is especially interesting as the first occurrence of the genus in Northwest America.

LEJEUNEA (COLOLEJEUNEA) MACOUNII, Spruce, n. sp.—Dioica (?), pusilla, albido-viridis, in plagas circumscriptas diffusa; caules 4-5 millimetra longi, filiformes, pellucidi, vage vel inæqualiter-pinnatim ramosi, intricati, parce radicellosi. Folia imbricata, patentia, subplana vel apice decurvula, basi brevi subtransversa inserta, oblique obovata, rotundata, medio margine postico late (non autem profunde) sinuato-complicata, papillulis scabra margineque subcrenulata; lobulus duplo brevior ovato-quadratus, ad sinum truncatus et bidentatus, lævis, ad plicam inflatus, deinde appresso-planus; cellulæ minutulæ, subincrassatæ, ovali-4-6-angulares, omnes fere medio papillulam globosam ferentes, præterquam paucæ subbasales (ceteris longiores) necnon lobuli cellulæ epapillosæ. Foliola nulla. Flores in caule ramisque terminales, innovati. Bracteæ erectæ, foliis breviores, laxe complicatæ, lobo anguste oblique obovato, lobulo duplo breviore lineari sub-acuminato; bracteola nulla. Perianthia emersa, dimidio infero obconica, supero rectangulari-oblonga, paulo compressa, alte 5-carinata, subtruncata, ubique præter basin versus papilluloso-scabra. Cetera haud visa. Folia .8×.5, lobulus .4×.25, cellulæ 1-60; bractæ lobus .65×.3; perianthium, .75×.3mm.

Hab. British Columbia, on maple bark, (Prof. Macoun), April 8th, 1889.

This elegant species is very distinct from all *Cololejeuneæ* hitherto described. Scabrous leaves are not infrequent in the group, but in *L. Macounii* the roughness arises from the presence of a globose papilla on each cell of the leaf proper, or greater lobe, such as exists in no other species known to me. The lobule, or lesser lobe, however, is smooth as it is also in *L. calcarea*, Lib., whose acuminate and muricate leaves amply distinguish it. *L. Macounii*, by its habit and by the form of its leaf and lobule, recalls a common tropical foliicolous species, *L. pellucida*, which belongs to a distinct group (*Diplasiolejeunea*) possessing large two-ranked underleaves. RICHARD SPRUCE.

February 3, 1890.

Botanical Notes.

Polygonatum biflorum, Ell., grows with us and is very common. *Polygonatum giganteum*, Dietr. in its wild form is very local, thus far being known only in the extreme northwest of the

State, although it is not uncommon in Windham Co., Conn. It is cultivated in many of our gardens and from the peculiar development in its degradation, I am very well satisfied that the one is a form of the other, for plants which were last year agreeable to the description, "glabrous throughout," "leaves partly clasping," "filaments smooth," "filaments inserted upon the middle of the tube," and therefore *P. giganteum*, this year from the same roots produce only such plants as have "sessile leaves," not "clasping," which are "pubescent and glaucous" beneath—with "roughened filaments" upon the "uppermost portion" of the perianth.

This is not the first time the impression has come to me concerning this plant, that two forms of one species were counted as two species, but I have had this season a better opportunity for observation of the matter. JAMES L. BENNETT.

Brown University.

A Handbook of the Mosses of Northeastern America.—Having learned that the edition of Lesquereux and James' "Manual of the Mosses of North America" is almost exhausted, and being assured that there is, in the East, a demand for a smaller and cheaper guide to the study of this group of plants, I have commenced the preparation of a work to bear the above title. The book will be illustrated, and the geographical area will include the northeastern and central States and eastern British America. It is hoped that the manuscript and drawings may be completed by the end of next year. ELIZABETH G. BRITTON.

Note on the Eastward Extension of Pentstemon albidus, Nutt.—In April, 1890, undoubted specimens of *P. albidus*, Nutt. were sent to the University of Minnesota, by Mr. L. M. Moyer, from Montevideo in the upper Minnesota Valley. It appears to be fairly abundant along the southern bluffs of the Minnesota River, in Big Stone, Chippewa and Renville Counties, and is apparently extending eastward along the valley. In this region *P. grandiflorus*, Nutt. is remarkably prevalent on high ridges and the two species occur together in the vicinity of Appleton. The range of *P. albidus* as given in the 6th edition of Gray's Manual is "Plains, Neb. to Dak. and Tex.," in Coulter's Manual of Rocky Mountain Botany, the range is, "Plains from Dak. to Col. and Tex." In

Minnesota it is restricted to the southwestern portion of the State and is not found on upland or rolling prairie, so far as yet determined. This plant has never before been reported east of the Missouri River. CONWAY MCMILLAN.

Note on Asplenium pinnatifidum. Considering the few recorded localities for *Asplenium pinnatifidum*, I think the following notes may prove of interest:

In June, 1886, Messrs. A. P. Brown, Stewardson Brown, and myself found this species growing sparingly on rocks in a deep glen on the west side of the Susquehanna River at York Furnace, York Co., Penn. We found it in the same locality in 1889 and again in June of the present year. On the last occasion, being convinced that the fern ought to be found in other similar localities along the river, we made a careful search for it and were rewarded by finding it in several other places in the woods bordering the river below York Furnace. In all cases it was growing on perpendicular rocks of an eastern exposure. No doubt further search will discover it at various other points along the river.

Another locality from which I have seen specimens of *pinnatifidum* is on a tributary of the Brandywine Creek near Mortonville, Chester Co., Penn. These specimens were collected by Miss Mary Steele a number of years ago, and I doubt if the plant is still to be found in this locality, as I have visited the place a number of times and have never been able to find it.

WITMER STONE.

Germantown, Pa..

Notes on two Carices.—Carex deflexa, Hornem., var. *Deanei*, Bailey. While collecting on the embankment of the old "Veazie Railroad" at Old Town, on May 24th, I found a small clump of this species—the only one I found that day. A few days later I found it growing in dry open woods at Orono, and have since found it quite abundant in a number of similar localities. The only station in Maine, recorded in the Manual, is Mt. Desert, 45 miles to the south.

Carex chordorhiza, Ehrh., is quite abundant in the "Bangor Bog," in Orono. Professor Bailey writes that he never heard of it before in Maine. MERRITT L. FERNALD,

Orono, Me.

Index to Recent American Botanical Literature.

Aconitum Fischeri. J. D. Hooker. (Bot. Mag. t. 7130).

Sir Joseph Hooker adopts this name for the Aconite of northeastern Asia and refers to it the *A. Columbianum*, Nutt. of the Rocky Mountains and Pacific coast, and the recently published *A. Noveboracense*, Gray, (BULLETIN, 1886, p. 190) of central New York; he even suggests that they all may have to go into the eastern North American *A. uncinatum*, L. Whatever may be the merits of *A. Columbianum*, which has already been regarded by American botanists at one time or another as identical with the Asiatic plant, we feel confident that *A. Noveboracense* represents a distinct species, and that *A. uncinatum* is equally valid. *A. Noveboracense* appears to us nearer related to *A. paniculatum*, Lam., of central Europe than to *A. Fischeri.*

N. L. B.

Alleghanies of Virginia in June—The. Anna M. Vail. (Garden & Forest, iii. 367, 368; 391–392).

Bur Oak—A Fine. (Garden & Forest, iii. 402, illustrated).

Accompanying a general description of *Quercus macrocarpa* is an account and representation of an individual specimen known as the "Cravath Tree," growing upon the farm of Mr. Miles G. Cravath, Whitewater, Wis.

Catalogue of the Uncultivated Flowering Plants Growing in the Ohio State University Grounds. Moses Craig. (Bull. Ohio Agric. Exp. Sta., i. 49–110, with map of grounds).

This list is concerned with the phanerogams only and contains 468 species and varieties. Common names are given in every instance where a common name is known. Tables of comparison are included, showing the number of genera and species in each order as found in the University grounds and as reported for the entire State. Also a table of comparison, showing the number of species in ten of the principal orders in the University grounds, Franklin County, and State. In like manner the number of species in the genera *Carex* and *Aster* are compared. The catalogue is manifestly a carefully prepared one and is unusually precise and full in regard to dates and locations. The nomenclature is somewhat antiquated, but as the author says he has been "striving always to employ the names sanctioned by the late Dr. Gray" the synonomy may be readily hunted up, especially as in numerous instances the author has caused synonyms to be printed in brackets. The work will certainly render the future study of botany at the State University a much easier task than when the author first undertook it.

Color Notes on California Wild Flowers. C. R. Orcutt. (Garden & Forest, iii. 438, 439; 450–451).

The author seems to think that color characteristics are apt to be "frequently ignored by botanists" and hence takes pains to say that he has compared his descriptions with the colored plates given in Ridgeway's "Nomenclature of Colors for Naturalists" and we are treated to such tints as "deep claret-brown" for *Fritillaria biflora*, "bright magenta" for *Lathyrus venustus*, "Heliotrope purple" for the spots in the corolla of *Frasera Parryi*, "Chinese orange" and "orange-vermilion" for *Calochortus Kennedyi*, "Pomegranate purple" for *Opuntia prolifera.* We are told that the corolla of *Erythræa venusta* is "of a shade belonging somewhere between solferino and magenta, too dark for rose purple!" *Lœselia tenuifolia* has flowers "something between a poppy-red and carmine." *Sphæralcea Emoryi* has "flame-scarlet" flowers. *Monardella lanceolata* is described as having "Phlox-purple" flowers, while the flowers of *Thamnosma montanum* are "prune-purple." It certainly would require a highly colored imagination to picture the appearance of the descriptions in Gray's Manual, for instance, if such a code of color nomenclature should be adopted.

Caraguata angustifolia. J. G. Baker. (Bot. Mag. t. 7137).

Contributions to Texan Botany. N. L. Britton. Trans. N. Y. Acad. Sci. ix. 181-185).

This includes (1) Additions to the List of Plants collected by Miss Mary B. Croft at San Diego, sixty-seven species being enumerated *Lippia ligustrina* (Lag.) Britt. is the older specific name taken up for *L. lycioides*, Steud. Several corrections are made in former determinations. (2) Note on some plants collected by Mr. Frank Tweedy in Tom Greene County in 1879, an enumeration of ninety-nine species, *Desmodium Tweedyi* being described as new.

Cratægus coccinea, L. var. macrantha, Dudley. L. H. Bailey. (American Garden, xi. 513, 514, fig. 1).

Dangerous Fungi. H. W. Harkness. (Zoe, i. 151-152).

Diatoms—Movements of. C. Onderdonk. (Microscope, x. 225-229.

Dogwood—The Flowering. (Garden & Forest, iii. 425, 426, fig. 54).

Includes a picture of a fine tree of *Cornus florida*, growing on the estate of A. L. Barber, Grimes' Hill, Staten Island, N. Y.

Elm—The Clark. (Garden & Forest, iii. 438, illustrated).

An account and figure of a celebrated tree of *Ulmus Americana*, growing upon the Clark-Hancock place at Lexington, Mass. and known to be about 125 years old.

Episcia maculata. (Bot. Mag. t. 7131).

Native of British Guiana.

Fermentation of Bread. Katharine E. Golden. (Bot. Gaz. xv. 204-209).

In this article the author describes the experiments made to determine the main factor in the raising of bread—whether due to *Saccharomyces cerevisiæ* or *Bacillus subtilis.* In conclusion she says: "It was demonstrated by the experiments that both yeast and bacteria can separately raise bread, and, under the conditions of the experiments, the yeast somewhat better than the bacteria. Now, whether or not they act together in raising bread ordinarily was not demonstrated, but from the fact that both organisms were found in large quantities in dough that had been raised by Fleischmann's yeast, and that bacteria are always in the air and in large quantities on the surface of the grain from which flour is made, and also that they occur in all preparations of yeast ferment, it seems to be the only satisfactory conclusion that both the bacteria and the yeast act together in raising most if not all kinds of bread."

Flora of the Californian Islands. T. S. Brandegee. (Zoe, i. 129-148).

This is essentially a list of the flora of these islands as recognized by the writer: 512 species are enumerated. The object of the paper is evidently to make an opportunity to throw doubt on the validity of the numerous species described from the territory by Professor Greene, a large number of which are here referred to mainland plants, the whole subject of the enumeration of the flora having just been exhaustively treated by Dr. Yates. Some of these reductions are probably desirable, as Professor Greene has proposed them, but a considerable number at least are very wide of the mark. The reference, for example, of five *Eschscholtzias* back to *E. Californica* indicates either that Mr. Brandegee's botanical instinct is not very highly developed, or else that personal dislike of Mr. Greene is warping his judgment. The nomenclature of the list is, to say the least peculiar, Linnæus being in several cases credited with binomials which he never wrote. N. L. B.

Flowers and Insects—V. Chas. Robertson. (Bot. Gaz., xv 199-204).

Insect visitors to the following plants are noted; *Astragalus. Mexicanus, Strophostyles angulosa, Amphicarpæa Pitcheri, Cercis Canadensis, Cassia Chamæcrista* and *Cassia Marilandica.*

Fungi of Western New York. Charles E. Fairman. (Proc. Rochester Acad Sci. 43-53; two plates. Also reprinted).

A general account of the mycologic flora of the region, followed by descriptions of new species in the following genera: *Didymosphæria, Anthostomella, Pseudovalsa, Vermicularia, Phoma, Diplodia, Sphæropsis, Sporidesmium, Mucor* and *Camarosporium.*

Fungous Diseases of the Spinach—Some. Byron D. Halsted. (Bull. No. 70, N. J. Agric. Exp. Sta.)

Peronospora effusa, Colletotrichum Spinaceæ, Phyllosticta Chenopodi, Entyloma Ellisii and *Cladosporium macrocarpum,* are figured and described.

Germination of Milkweed Pollen—Artificial. Byron D. Halsted. (Microscope, x. 229, 230, illustrated).

Observations upon the pollen of *Acerates viridiflora.*

Hansteinia et Stenostephanus—Sur les Caracteres des. H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 855).

A discussion of the relations of these Mexican genera.

Helianthemum—A New. W. H. Evans. (Bot. Gaz. xv, 211).

H. Canadense var. *Walkeri* is described from specimens collected at Castle Rock, Colo., by Mrs. S. B. Walker.

Hepatiques Nouvelles des Colonies Francaises. E. Bescherelle et Richard Spence. (Bull. Soc. Bot. France, xxxvi. 177–189, t. XIII–XV).

In the prefatory note M. Bescherelle explains that his only collaboration consisted in sending the material and notes to Dr. Spruce. The species are arranged geographically, thirteen from Guadaloupe, in the genera *Mylia*, *Lejeunea*, *Blepharostoma*, *Cephalozia*, *Kantia*, *Leioscyphus* and *Jungermannia* ; one *Lejeunea* from French Guiana and the remaining six species not American.

Hepaticæ Novæ Americanæ Tropicæ et Aliæ. Richard Spruce. (Bull. Soc. Bot. France, xxxvi. 189–207, t. XVI–XVII.

These also were sent to the author by M. Bescherelle, three from Mexico, fourteen from Paraguay, two from the Argentine Republic and fourteen from Brazil collected by Balansa, Hieronymus and Glaziou. The following genera are represented: *Frullania*, *Lejeunea*, *Radula*, *Lophocolea*, *Aneura*, *Riccia*, *Anthoceros*, *Lepidozia*, *Chiloscyphus*, *Plagiochila* and *Metzgeria*. Under *Lepidozia plumæformis*, n. sp., is cited one of Dr. Rusby's collection from Bolivia. The plates in both these papers are lithographed from drawings by W. H. Pearson.

E. G. B.

History of Garden Vegetables—The. E. L. Sturtevant. (Am. Nat. xxiv. 719–744).

Notes are given upon the following plants: "Skirret," (*Sium sisarum*) ; "Snails," (*Medicago scutellata*) ; "Soja" Bean, (*Soja hispida*) ; "Sorrel," (*Rumex sp.*) ; "Southernwood," (*Artemisia Abrotanum*) ; Spinach, (*Spinacea, sp.*), and Squash, Pumpkin and Gourd, (*Cucurbita*, *Pepo*, *Melopepo*, etc). The latter vegetables are described at some length, and the memoranda in regard to the importance of squashes and pumpkins as a food product in early colonial times are of considerable interest. Whether or not they all originated in this country seems still to be in doubt, but the author concludes that * * "as the present types have all been recorded in the Old World since the fifteenth century, and were not recorded before the fourteenth and succeeding centuries, there must be a connection between the fact of the discovery of America and the fact of the appearance of pumpkins and squashes in Europe." In regard to the gourd the author thinks there is still room for investigation in regard to its status as a native or introduced plant in this country, but apparently inclines to the belief that it has been introduced.

Hypoxylon Broomeanum, Berk. and Curt.

It is remarked in "Grevillea," xix. 21, that specimens named *H. amorphum*, Ell. and Ever. are clearly the above species.

Kalmia—A Curious Form of. C. S. Sargent. (Garden & Forest, iii. 452, fig. 56).

Description and figure of a monstrous form of *Kalmia latifolia* found at Deerfield, Mass. The corolla lobes are divided into five linear petals, alternate with the calyx lobes, and some of them producing abortive anthers. The variety seems to be constant, can be propagated by grafting, and is freely fertile in cultivation.

Locust Trees—The American. (Gard. Chron. viii. 181, 182).

An interesting account of *Robinia pseudacacia* in Europe, especially of the individual, yet living in the garden of the Museum in Paris, which was known to have been raised from seed in 1635, and is believed to be the first of its species that was made to grow in the Old World.

Neolindenia, Sur le. H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 851, 867-868).

Notes on a new genus, doubtfully referred to the Acanthaceæ, from Chiapas, Mexico.

Notes on the Canyon Flora of Northwest Nebraska. T. A. Williams. (Am. Nat. xxiv. 779, 780).

Notes on the Flora of the Lake Superior Region. E. J. Hill. (Bot. Gaz. xv. 140–149; 159–166).

Notes on the Ligneous Vegetation of the Sierra Madre of Nuevo Leon. C. G. Pringle. (Gard. & For. iii. 337, 338, 362–363).

Outlines of Wood's "How to Study Plants." (Pamph. pp. 28. Indiana Teachers' Reading Circle, 1890-'91).

Passiflora vitifolia. (Gard. Chron. viii. 212, fig. 32).

Pleurothallis platyrachis. (Bot. Mag. t. 7129).

Native of Costa Rica.

Prunus Allegheniensis. T. C. Porter. (Garden & Forest, iii. 428, fig. 53).

A capital figure of this interesting species.

Pyrus arbutifolia. C. S. Sargent. (Garden & Forest, iii. 416, fig. 52).

In this contribution the author contends for specific rank for the two plants generally regarded as var. *melanocarpa* and var. *erythrocarpa.* Marked differences in time of flowering, size and color of fruit and time of its ripening and falling, in addition to leaf characteristics, are given. Under this arrangement we should have *Pyrus arbutifolia,* (L.) L.f. for the red-fruited species and *P. nigra* (Willd.) Sargent, for the black-fruited one. The point seems to us to be well taken.

Ruelliées exceptionnelles—Sur Plusieurs. (H. Baillon. (Bull. Mens. Soc. Linn. Paris, i. 852, 853).

Descriptions of *R. colorata* from Peru, and *R. Chiquitensis* from Bolivia, (Weddell No. 3495).

Scribner—Professor F. Lamson. (Orchard & Garden, xii. 149, illustrated).

Biography, with portrait.

Shortia galacifolia. (Garden, xxxviii, 204, 205, plate 768).

The history of *Shortia* is here briefly given, accompanied by a full page colored plate of the plant.

Some Effects of the Mild Winter. Jacob Schneck. (Bot. Gaz. xv. 209–211).

The memoranda in this article refer to the vicinity of Mt. Carmel, Ills., and we are told that *Malva rotundifolia, Stellaria media, Alyssum maritimum, Capsella Bursa-pastoris, Bellis perennis* and *Lamium amplexicaule* were in blossom all winter and were only checked by a spell of cold weather in March.

Spruce Pine—The Florida. Carl Mohr. (Garden & Forest, iii. 402, 403).

Describes the habitat and surroundings of *Pinus clausa* with with its accompanying vegetation.

Sweet Gum—The. (Garden xxxviii. 208, illustrated).

An account of the introduction into England of *Liquidambar styraciflua* and its occurrence there.

Triumfetta semitriloba. H. H. Rusby. (Reprint from Drug. Bull. Aug. 1890, illustrated).

Tulip Tree—The. (Gard. Chron., viii. 218, 219, fig. 36).

A representation of a large tree in Kew Gardens.

Virginia Creeper—The. E. S. Goff. (Garden & Forest, iii. 392–394).

Attention is called, in this brief note, to the fact that *Vitis quinquefolia* seems to produce two well marked varieties, one producing sponge-like disks and hence climbing everywhere readily, the other producing tendrils without disks which assist the plant in clambering up rough surfaces only. We have seen mention made of these two varieties before, and the importance of distinguishing between them is often highly important when the vine is to be planted for ornamental purposes. Observation of the natural geographical distribution of the two forms would be valuable.

Water Lilies—Notes on Mexican. C. G. Pringle. (Garden & Forest, iii. 415). *Nymphæa Mexicana, N. elegans, N. ampla* and *N. gracilis* are described.

In regard to the latter species the author says: "Of the several species under consideration this one alone, as I believe, possesses any marked fragrance. Its root-stock is a tuber rather than a rhizome—or such at least it appears in autumn, after all the rest of the plant has perished—an ovoid body one to three inches in length, with thick and hard outer shell, covered with bosses quite like a pine cone in appearance. In this state the plant is prepared to hibernate and endure safely the droughts of the earlier months of the year, when many of the shallow lakes which it inhabits are dried up, and the land, where they lie tumbling about on the surface, is even growing a crop of wheat."

*West American Oaks. Part II.** E. L. Greene. Pamph. 4to., pp. 30, plates 13; San Francisco, Cal., June, 1890).

Part two of this splendid work has been issued under the same conditions as part one—Mr. James M. McDonald assuming the financial responsibility and Prof. Greene undertaking the necessary botanical explorations and descriptions. The general style of Dr. Kellogg's drawings has been preserved, so that there is a gratifying uniformity throughout, and this latter part is a fitting sequel to the great work so well begun. *Quercus Gilberti* and *Q. venustula* are described as new. A problematic specimen of *Q. Gambelli*, from Bear Creek Cañon, Col., is figured and so named, provisionally, but the author says that he suspects it may ultimately be found worthy of varietal rank. *Q. Jacobi* is figured on the same plate with *Q. Garryana*, Dougl., with which it has been frequently confounded, and *Q. Macdonaldi*, var *elegantula*, is figured and described as a probable hybrid between *Q. Engelmanni* and *Q. dumosa*. Changes from generally accepted names are few. *Q. Dunnii*, Kellogg, (1879) becomes *Q. Palmeri*, Engelm. (1876). The use of trinomials by the author we note again with regret, not only because they are frequently misleading in regard to the authority for the specific name, but also because it seems a needless innovation. As an example we may quote *Quercus Macdonaldi elegantula*, Greene, which is strictly correct, so far as the authority is concerned, as Prof. Greene is the author of both specific and varietal name, but when he writes *Quercus dumosa polycarpa*, Greene, it is misleading, for the reason that the name of Nuttall, the author of the species, does not appear. A. H.

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* For review of Part i, see BULLETIN, xvi. 177, 178.

Proceedings of the Club.

The regular meeting was held at Columbia College, Wednesday evening, Sept. 24th, the President in the chair and eighteen persons present.

Reports of several of the field excursions during the summer were received.

Mrs. Britton remarked on *Sabbatia stellaris*, forma *albiflora*, collected in abundance at South Beach, Staten Island, and on her discovery of spurs on the two outer sepals of *Impatiens biflora* at New Dorp. She also stated that *Habenaria ciliaris* was exceedingly abundant in flower at Linden Park, whereas last year only two or three plants were found in bloom. The President suggested that this species might be uniformly biennially flowering. Mr. Ogden reported it in full flower at Tenafly, N. J., this season, and the Secretary stated that flowers were abundant at that station in 1888.

Dr. Newberry remarked on his recent trip to the Adirondack region.

Mrs. Northrop gave a preliminary account of the vegetation of the Bahama Islands.

OTANIC
HARVARD

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVII.] New York, November 9, 1890. [No. 11.

Contributions to Canadian Bryology.—No. 3.*

BY JOHN MACOUN.

Continued from Vol. XVI., p. 90.

GRIMMIA DENSA, Kindb. n. sp.

Diœcious. Plants 2–3 cm. high, densely tufted, coherent, green, at the base brown. Leaves patent, not crisped, muticous (without hairpoint), long-lanceolate, borders reflexed; upper cells short, middle ones sinuous, lower narrower and not sinuous, alar quadrate; costa not winged at back. Capsule elliptical, plicate-rugulose when dry, not costate, yellowish brown, declined upon a 0.6 cm. long, curved and flexuous pedicel; beak long and straight; teeth irregular 2-4-fid. to ⅔, dark red, patent when dry, annulus large, 3-seriate.

On rocks, summit of Mount Benson, near Nanaimo, Vancouver Island, June 3, 1887. Alt. 3,000 feet.

G. HETEROPHYLLA Kindb. Mss.

On rocks on the mountains between the Nicola and Thompson rivers, at Spence's Bridge, B. C. Alt. 2,500 feet. May 28th, 1889.

GRIMMIA SARCOCALYX, Kindb. Mss.

On rocks on the summit of the mountain between the Nicola and Thompson rivers, at Spence's Bridge, B. C. Alt. 3,500 feet. May 28th, 1889.

GRIMMIA CONCINODONTOIDES, Kindb. Mss.

On dry rocks overlooking the Thompson River, at Spence's Bridge, B. C. Alt. 3,500 feet. May 28th, 1889.

GRIMMIA NIVALIS, Kindb. n. sp.

Tufts blackish, low and compact. Stems denudate below.

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*Owing to lack of space we have been forced to omit nearly all species from Prof. Macoun's list except those described as new by Dr. Kindberg.—[EDS.]

Leaves small, short, ovate-lanceolate, acute, muticous or indistinctly piliferous, flat on the borders, the uppermost and the perichetial ones longer and narrower with a smooth and long hair-point; cells quadrate, chlorophyllose, the lower hyaline, short-rectangular; costa percurrent. Inflorescence diœcious. Capsule exserted, wide-mouthed when empty, not rugose nor striate; teeth orange, nearly entire, spreading when dry; lid mammillate; pedicel arcuate, elongate, pale. Differs from *G. plagiopodia* in the longer acute leaves and the pedicel very much longer than capsule.

On rocks on the summit of the Gold Range, north of Griffin Lake, B. C. Alt. 7,000 feet. Aug. 10, 1889.

RACOMITRIUM ROBUSTIFOLIUM, Kindb. n. sp.

Differs from *R. Macounii* in the leaves being less crispate, pellucid, more reflexed on the borders, often furnished with a short hairpoint. Capsule oval, striate or plicate when dry; teeth dark purple-brown, deeper cleft, papillose; the beak of the lid *oblique*, needle shaped, very much shorter than the capsule; pedicel slightly curved.

Both these species differ from *R. varium* in the short pedicel and the longer leaves.

Mount Arrowsmith, Vancouver Island, alt. 5,700 feet, July 17, 1887.

RACOMITRIUM BREVIPES, Kindb. n. sp.

Habit of *R. heterostichum* or *R. canescens.* Plants dirty green; branches nodose with numerous short branchlets. Leaves very faintly papillose, ovate-lanceolate, long-acuminate, more or less revolute, hair-point long and rough; cells yellow, the upper short or elongate, the alar distinctly quadrate. Capsule small, oblong-cylindrical with a short oblique beak; pedicel short, 0.5 cm. Peristome not examined.*

On sloping garnetiferous rocks near the summit of the Gold Range, north of Griffin Lake, British Columbia; alt. 6,700 feet. Aug. 8, 1889. Coll. John Macoun. No. 395, Canadian Mosses. *Var. ericoides,* B. and Sch. (Bry. Eu. t. 271).

On rocks at Victoria, Vancouver Island, and at Hastings and North Arm Burrard Inlet, B. C., 1889.

VAR. MUTICUM, Kindb. n. var.

Leaves without a hair-point; cells yellow; costa absent. Barren. On rocks summit of Gold Range, at Griffin Lake, B. C. Aug. 1889.

Scouleria Nevii, C. Mull.

S. aquatica, var. *nigrescens*, Kindb., BULLETIN, xvi. 94.

Abundant on stones in mountain brooks at Sicamous and Griffin Lake, B. C., 1889.

ENCALYPTA LEIOCARPA, Kindb. n. sp.

Habit of *E. streptocarpa*. Monœcious. Tufts large, densely radiculose and fuscous below; the young shoots dark green. Upper leaves patulous, when dry incurved, from a diaphanous base lingulate, obtuse, muticous; lower leaves suberect; costa scabrous at back, not excurrent; perichetial bracts not acuminate, perigonial thick-apiculate. Capsule pale, cylindric, not striate, sometimes with a short apophysis; peristome simple; teeth sublinear, papillose, orange and erect; seta red. Calyptra papillose for its whole length, reaching below the capsule, not fringed, dusky yellow.

On rocks summit of Mount Queest and other mountains in the Gold Range, B. C. Alt. 6,500 feet. August 8, 1889.

Webera albicans, Schimp., var. DEFLEXA, Kindb. n. var.

Differs in the leaves revolute nearly all around, the peristome pale yellow, the lid lower.

On the borders of rich woods, Vancouver Island; also Salt Spring Island, Gulf of Georgia. May 10, 1887.

VAR. MACROSPORA, Kindb. n. var.

Leaves denticulate to the middle; costa excurrent. Spores large, about 0.03 mm.

On the mountains north of Griffin Lake, Gold Range, B. C. Alt. 6,500 feet. August 10, 1889.

Bryum Breidleri, Jur. Mountains north of Griffin Lake in the Gold Range, B. C.

This species and *Webera gracilis* were growing in great profusion where snow had just disappeared. August 10, 1889.

BRYUM DENTICULATUM, Kindb. n. sp.

Differs from *B. pseudotriquetrum* in the leaves being loose, distantly denticulate to the middle, lanceolate-acuminate, reflexed at the base.

In a bog, Roger's Pass, Selkirk Mountains, B. C. August 21, 1885.

B. Donianum, Grev. (Linn. Trans. xv. t. 3).

Allied to *B. capillare*, but differing in the leaves being near the top of the branches, short-acuminate, slightly or shortly mucronate, the capsule slightly curved, the inner peristome not higher than the outer in a dry state, the spores smaller, about 0.01 mm. long or less.

On rocks at Hastings, B. C. April 11, 1889.

B. hydrophilum, Kindb. Read for *B. hydrophyllum*, BULLETIN, xvi. 95.

B. obconicum, Hornsh. sub-sp. CONSTRICTUM, Kindb. n. sub-sp.

Stem higher; leaves green, larger, narrow-margined above; costa reddish, long-excurrent; capsule larger, constricted below the mouth; spores very small, 0.01 mm. long.

Swamp in the Columbia River Valley at Donald, B. C., July 8th, 1885.

B. pallescens, Schleich., var. LAXIFOLIUM, Kindb. n. var.

Leaves loose, not glossy, long and narrow; upper cells narrow; spores small, about 0.01 mm.

Kananaskis Pass, Rocky Mountains, in damp woods. June 23, 1885.

Var. LONGIFOLIUM, Kindb. n. var.

Leaves dense, glossy, very long-attenuate; upper cells narrow; spores small.

On wet gravelly soil at Morley, Rocky Mountains. June 13, 1885.

B. PERCUMCENTINERVE, Kindb. Mss.

On dripping rocks in a ravine just west of Kamloops, B. C. June 18, 1889.

B. Rauii, Aust. On wet earth at Agassiz, B. C. 1889.

Dr. Kindberg says of this species that it is quite distinct from the European *B. Muhlenbeckii* to which it was referred by Lesquereux and James.

Mnium medium, Br. & Sch., sub-sp. ROBUSTUM, Kindb. n. sub-sp.

Leaves larger than the species, ovate-oblong, more densely denticulate, broadly yellow-margined, the comal scarcely larger than the middle ones; costa yellow. Capsules clustered, 2-4, pale, lid higher, conical, short-apiculate; pedicel shorter than the stem.

On logs and rocks in shaded woods near Victoria, Vancouver Island. June 11, 1887.

ATRICHUM (CATHARINEA) LEIOPHYLLUM, Kindb. n. sp.

Plants erect, simple, naked below, densely foliate above. Leaves smooth, lower very small, upper lanceolate and acute-cuspidate, not margined, the base scarcely broader; borders sharply serrate, with large teeth, the basal only entire; basal cells narrow, the others round-hexagonal, all pellucid; costa percurrent; lamellæ 6, disappearing below the apex, entire or slightly crenulate. Capsule single, long, sub-cylindric, thicker below, slightly curved, constricted at the mouth; lid obliquely rostrate from a conic base; perichetial leaves long-cuspidate with excurrent costa; pedicel bright red. Diœcious.

In damp woods on the lower slopes of Mount Arrowsmith, Vancouver Island. July 18, 1887.

ALSIA MACOUNII, Kindb. n. sp.

Loosely cæspitose, bright green. Secondary stems pinnately divided, branching from the middle,; branches crowded, single or rarely pinnate, obtuse, not circinate when dry. Leaves involute above, papillose-dentate at the back, branch-leaves imbricate open-erect, five-ranked, ovate, or oblong obtuse, reflexed below, serrulate above the middle; cells oval-oblong and pellucid, the alar smaller and obscure, sub-quadrate; costa percurrent; upper perichætial leaves sheathing, filiform-acuminate, capsule red, plicate-rugulose, oval-oblong, longer than the pedicel; teeth trabeculate, yellowish inside, papillose; cilia short and smooth; annulus simple, adhering at the long-rostrate lid. Diœcious.

This species is by Lesquereux confounded with the true *Alsia abietina*, by others with *Alsia Californica*. On trees at Sooke, Vancouver Island and on Salt Spring Island; also on rocks at Yoll, B. C. May 17, 1875.

Neckera Douglasii, Hook., var. MACOUNII, Kindb. n var.
(*Neckera Macounii*, Kindb. enumer. bryin. exotic).

Differing principally in the leaves less attenuate aud the capsule turgid oval, completely exserted on the long pedicel (not "narrow, half-exserted").

On large boulders between Cathedral Mountain and Mount Stephen, Rocky Mountains; also on trees at Hastings, B. C. and Comox, Vancouver Island.

ANTITRICHIA TENELLA, Kindb. n. sp.

Tufts loose, green; secondary stems irregularly divided; branchlets numerous, the greater number very short. Leaves small, sub-patent or loosely appressed when dry, ovate-acute or short-acuminate, dentate at the apex, not striate, reflexed to the apex; the greater number of cells short, the inner and middle narrow; costa with 1-2 accessorial branches at the base, disappearing below the apex; perigonial leaves elongate. Diœcious. Female plants unknown.

Amongst *Racomitrium varium* on rocks below the railway bridge over the Nanaimo River, Vancouver Island. April 26, 1887.

PLATYGYRIUM RUPESTRE, Kindb. n. sp.

Plants intricate, cæspitose, pale brownish-green, not glossy. Stems irregularly divided, branchlets short, filiform, not creeping. Leaves small, densely crowded, when dry appressed, open-erect when moistened, scarious and pellucid, not chlorophyllose nor papillose, subovate, acute or long-acuminate, the upper denticulate above, the borders recurved below, sometimes to the middle or above it; areolation in the lower leaves sublinear above, looser at the base, in the upper leaves looser, oblong-linear, in all subquadrate at the borders and at the base; costa none. Diœcious.

The generic position of this plant collected only in a barren state is not yet certainly defined.

On the face of a cliff above the first tunnel at Yale, B. C. May 17, 1889.

HOMALOTHECIUM CORTICOLA, Kindb. Mss.

Cedar Hill near Victoria, Vancouver Island. April 21, 1887.

PSEUDOLESKEA SCIUROIDES, Kindb. n. sp.

Macounia sciuroides, Kindb. enumer. bryin. exot., 1888.

Diœcious. Stems creeping, loosely tufted, irregularly branching. Branches attenuate and incurved; paraphyllia filiform or subulate. Leaves from the ovate base attenuate to a long denticulate point, reflexed on the borders, recurved or straight not striate, most of the cells oblong; costa stout, percurrent. Perichetial leaves ovate-oblong, abruptly attenuate to a filiform or subulate point, not reflexed on the borders; areolation narrower; costa thinner, disappearing below the point. Capsule oblong, suberect or inclined, not striate; pedicel 1-5 cm. long. Spores 0.02 mm. Lid and calyptra unknown. Peristome orange-colored; teeth densely articulate with indistinct longitudinal line, subulate and hyaline-bordered, when dry incurved; segments scarcely shorter or narrower, pertuse in the middle; basilar membrane very short; cilia smooth.

On rocks in the valley of Elk River, Rocky Mountains, B. C., 1883. Dr. G. M. Dawson coll.

PSEUDOLESKEA OLIGOCLADA, Kindb. n. sp.

Allied to *Pseudoleskea atrovirens.* Tufts loose, dark brown, sparingly radiculose. Secondary stems sparingly branched; branchlets distant, short and julaceous; paraphyllia numerous. Leaves appressed when dry, falcate when moist, reflexed on the borders, abruptly attenuate from the short ovate base to the longer, sub-entire acumen, not striate; cells not confluent, short with incrassate walls, oblong-quadrate, only the uppermost narrow; costa stout and very long; perichetial leaves longer, acuminate, scarcely reflexed on the borders; cells narrower; archegonia 10-12, paraphyses few, shorter. Diœcious. Capsules and male plants unknown.

On damp rocks, Mount Benson, Nanaimo, Vancouver Island, June 8, 1887.

M. Cardot believes that this plant is a variety of *Pseudoleskea atrovirens.*

THUIDIUM (CLADOPODIUM) LESKEOIDES, Kindb. n. sp.

Plants very small; tufts intricate, green, not glossy; stems filiform, irregularly divided, without paraphyllia; branches not attenuate, rootless. Leaves small, loose, erect-spreading, ovate-oblong, acute or short-acuminate, very papillose, not pellucid, erect on the borders, serrate all around; cells rotundate, the alar scarcely distinct; costa percurrent. Barren. Habit of *Heterocladium heteropterum.*

On rocks at Cedar Hill, Vancouver Island, April 21, 1887.

THUIDIUM VANCOUVERIENSE, Kindb. n. sp.

Plants minute, densely and irregularly pinnate, sparingly radiculose, rarely flagelliferous, dark green, not glossy; branches short, very slender. Leaves ovate-deltoid, denticulate above the middle, pellucid, faintly papillose; stem leaves decurrent, at the base reflexed, acute; branch leaves smaller, looser, more concave, oval and obtuse; cells hexagonal-oval, or rhombic, the alar and marginal quadrate-rhombic; costa slender, short, scarcely reaching to the middle. Paraphyllia few or none. Perichetial leaves longer acuminate, cells narrower. Capsule small oblong, sub-erect; pedicel 1 cm. long. Diœcious.

On rocks on the upper slopes of Mount Finlayson, at Goldstream, Vancouver Island, May 31, 1887.

Camptothecium hamatidens, Kindb., var. TENUE, Kindb., n. var.

Branches longer, filiform, leaves smaller only at the base and hooked-denticulate at the apex. On rocks, Mount Erskine, Salt Spring Island, Gulf of Georgia, May 10, 1887.

BRACHYTHECIUM PSEUDO-ALBICANS, Kindb. n. sp.

Differs from the true *B. albicans* (Neck.), in having the leaves looser, sub-distichous, shorter-acuminate, faintly striate, denticulate all around; the alar cells greater, all the basal cells finally reddish. Barren.

No. 235 Canadian Musci in part. On the sand spit and in woods on the ground at Comox, Vancouver Island, May 5, 1887.

BRACHYTHECIUM LÆVISETUM, Kindb. n. sp.

Habit of *B. populeum.* Plants cæspitose, green and glossy. Stem irregularly ramulose. Leaves close, sub-erect, open, ovate-lanceolate acuminate and acute, sulcate; borders serrulate from the middle upwards; basal cells dilatate; costa long, reaching at least to two-thirds. Capsule small, incurved, oblong; outer teeth hyaline-margined, light brown, cilia short and not appendiculate; perichetial leaves nerveless; lid highly convex not apiculate; pedicel very smooth. Monœcious.

In small quantity on a rotten log in the valley of Eagle River, Craigallachie, Gold Range, British Columbia, July 17, 1889. Coll. J. Macoun. No. 326, Canadian Mosses.

ISOTHECIUM CARDOTI, Kindb. Mss.

On the base of trees in the open woods, Hastings, B. C., also on logs near Victoria, Vancouver Island. A very beautiful species.

ISOTHECIUM MYURCELLUM, Kindb. n. sp.

Tufts very loose, dark green, not glossy. Stems creeping; branches (secondary stems) erect, tree-like and ramose; branchlets curved, attenuate. Leaves of the branchlets appressed when dry, small, ovate, blunt or short acuminate, twice serrate or denticulate all around, smooth, scarcely reflexed on the borders; alar cells round-quadrate, the middle ones narrow, upper rhombic; costa long, three-fourths the length of the leaf. Perichetial leaves nerveless, oblong with a long, denticulate, horizontally patent acumen and narrow cells. Capsule oval-oblong, inclined; segments with a low basilar membrane and two short cilia; annulus double; lid conical acuminate; pedicel smooth. Diœcious.

On decaying logs in woods around Victoria and at Nanaimo River, Vancouver Island, April 26, 1887.

EURHYNCHIUM DAWSONI, Kindb. n. sp.

Stems densely pinnate, not or rarely radiculose; branchlets patent. Leaves green or brownish, not glossy, not or indistinctly papillose, not long acuminate from the broad ovate base, recurved on the borders below, long-decurrent, open-erect, denticulate all around, areolation variable, often sub-rhomboidal; costa thick, reaching nearly to the apex. Probably diœcious.

Allied to *E. hians* and *E. Sullivantii.*

On rocks along the Nanaimo River below the Railway Bridge, Nanaimo, Vancouver Island, April 27th, 1887.

Plagiothecium sylvaticum, var. SQUARROSUM, Kindb. n. var.

This is a distinct variety, presenting a squarrose appearance when dry. On earth at Hastings, Burrard Inlet, B. C., April 27, 1889.

PLAGIOTHECIUM (ISOPTERYGIUM) BIFARICELLUM, Kindb. n. sp.

Plants small, sparingly radiculose, loosely cespitose, dark or blackish green, not glossy. Stems rigid pinnate. Leaves loose, small, spreading, smooth and not striate; stem-leaves at the base broadly ovate-cordate, decurrent, serrulate all around, abruptly attenuate to the filiform, hooked-deflexed and sub-entire acumen; cells narrow, linear, the basal oblong; costa obsolete or reaching to the middle. Diœcious.

Wet places in woods at Comox, Vancouver Island, May 3, 1887.

A. serpens, L., sub-species COLUMBIÆ, Kindb. n. sub-sp.

Leaves loose, spreading, serrulate all around, costa longer.

On earth in woods at Sicamous, B. C., July 19, 1889.

HYPNUM (CAMPYLIUM) MACOUNII, Kindb. n. sp.

Allied to *Hypnum hispidulum.* Habit of the European *H. Halleri.* Monœcious. Plants small, interlaced in dense brownish-green tufts. Stems pinnate, prostrate, sparingly radiculose. Leaves densely crowded, squarrose-recurved, round-deltoid,short-acuminate, reflexed on the borders of the entire base to the denticulate acumen; alar cells quadrate, pellucid, not numerous, the other short oblong or short lanceolate; costa obsolete or none. Capsule small narrow-cylindrical, slightly curved, annulus simple; basilar membrane low; lid convex, obtuse and not apiculate; pedicel reddish-brown, smooth 2 cm. long.

On earth by springs at Mount Stephen on the Canadian Pacific Railway, Rocky Mountains. Alt. 5,600 feet. July 28, 1885.

Hypnum (*Campylium*) *Sommerfeltii*, Myrin.

On the bases of trees at Hastings and Griffin Lake in the Gold Range, B. C., 1889.

H. (HARPIDIUM) LONGINERVE, Kindb.

In BULLETIN, xvi. 97, this species is described as *Dichelyma longinerve.* Later examinations have shown it to be a true *Harpidium.*

H. (*Rhytidium*) *robustum,* Hook.

Very abundant on the slopes of Mounts Benson and Arrowsmith, Vancouver Island. This is the plant upon which Austin founded *Hylocomium Flemmingii.* He saw neither flowers nor fruit. It was fruiting abundantly in 1887.

H. subimponens, Lesq., var. CRISTULUM, Kindb. n. var.

Hypnum cristulum, Kindb. enum. bryineæ. exot., 1888. Intermediate between *H. fertile* and *H. crista-castrensis.* Stems regularly pinnate, rootless. Leaves green or brownish-green, estriate, filiform-pointed, the point a little shorter than the lanceolate base. Capsule yellow, cylindric narrow, faintly curved, sub-erect; teeth at the base pale yellow, hyaline above; perichetial leaves faintly striate. Probably diœcious.

Quite common on rocks in oak woods around Victoria, Vancouver Island, April 17, 1887.

HYPNUM (DREPANIUM) CANADENSE, Kindb. n. sp.

Intermediate between *H. imponens* and *H. sub-imponens.* Diœcious. Densely cæspitose, yellow or pale green. Stems creeping, densely pinnate-ramulose; branches robust, thick and tumid. Leaves close, falcate, with elongate-ovate or oblong base and short acumen, faintly or not striate, more or less denticulate all around, not reflexed on the borders, larger than in *H. imponens;* cells very narrow, the alar (one or two) large and pellucid, the other basal cells yellow; paraphyllia few, subulate. Perigonial leaves very broad-ovate, abruptly narrowed to a straight subulate point.

No. 314 Canadian Mosses. On rotten logs at the summit level of the Canadian Pacific Railway, near Hecton, Rocky Mountains. Alt. 5,300 feet. July 23, 1885.

H. (LIMNOBIUM) PSEUDO-ARCTICUM, Kindb. n. sp.

Differs from *H. arcticum* in the leaves being crenulate at least above the middle; costa short and double, not reaching to the middle; perichetial leaves short-acuminate, serrulate. Inner peristomal teeth rimose in the middle. Stem sparingly rooting.

On stones in mountain brooks near Sicamous; and in brooks on mountains north of Griffin Lake, B. C., July 8, 1889.

An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1885-1886.—XIV.

(Continued from page 214.)

LOASEÆ.

LOASA CANARINOIDES (Leune et C. Koch) (*Illiaria canarinoides* Leune et C. Koch, Flore des Serres t. 913). This very beautiful vine, supposed by M. Planchon to have been introduced to German gardens from Central America, was found by Dr. Rusby in considerable quantities on the slopes of the Andes near Unduavi, Bolivia, at an altitude of 8,000 feet. His specimens differ slightly from the type of t. 5022 of Bot. Mag., in having blunter petals. Unfortunately all the specimens yet preserved are in flower only.

Loasa heptamera, Wedd. Chlor. And. 218, ex descr. (*L. horrida* Britt. mss.). Near La Paz, 11,000 ft. (663). The same as Mandon's 619.

Blumenbachia lateritia, Hook. f. Same locality (664). The same as Mandon's 618.

TURNERACEÆ.

(Named by Mr. R. A. Rolfe.)

Periqueta cistoides (L.) Meyer; Steud. Nomencl. 724. Falls of Madeira, Brazil (1451).

Turnera odorata, Rich. Act. Soc. Hist. Nat., Paris, 1792, 107. Falls of Madeira (1792).

Turnera Weddelliana, Urb. & Rolfe. Reis, 1,500 ft. (2094); Guanai, 2,000 ft. (2653).

PASSIFLORACEÆ.

(Species of *Tacsonia* and *Passiflora*, determined by Dr. M. T. Masters.)

Tacsonia insignis, Mast. in Gard. Chron. (1873) p. 1112, fig. 239. Near Yungas, Bolivia, 4,000 ft. (2465).

Passiflora fetida, var. *nigelliflora*, Mast. (*Passiflora nigelliflora*, Hook.) Falls of the Madeira, Brazil (2457).

Passiflora tricuspis, Mast. in Flor. Brazil xiii, part 1. (1872), p. 587. Mapiri, Bolivia, 5,000 ft. (928^a and 496).

Rami compressi asperati. Species adhuc imperfecte cognita. Specimina a cl. Rusby lecta quoad folia omnino cum illis a Bur-

chellio carptis sub numero 6.988-2 conveniunt. Exemplaria tamen manca Gardneri (1631) et Weddell (3025.) a me hic relata paullulum diversa videntur. Sequitur floris descriptio a specimine Rusbyi desumpta:—Flores patelliformes diametro pollicares. Sepala pilosula oblonga ecarinata mutica. Petala sepalis paulo breviora conformia tenuiora albida. Corona faucialis extima filamentosa filis sepalis paulo brevioribus, filis secundæ seriei liguliformibus apice clavatis procedentibus dimidio brevioribus. Corona media procedenti approximata membranacea annularis valde plicata horizontaliter inflexa. Corona infra mediana annularis crassiuscula. Cœt. non visa. Species c. *P. trifasciata* aliquando comparanda.

Passiflora cœrulea, L. Sp. Pl. 959. Tacna, Chili. Cultivated (489).

Passiflora triloba, Ruiz et Pavon; Mast. loc. cit. p. 560. Junction of Rivers Beni and Madre de Dios. (490).

Passiflora coccinea, Aublet; Mast. l. c. p. 605. Junction of Rivers Beni and Madre de Dios. (492.) Yungas, 4,000 ft. (493).

PASSIFLORA RUSBYI, spec. nova. Fruticosa cirrhosa, cirro supra basin deciduo parte residua spinam fingente ramis teretibus sulcato-striatis; petiolis eglandulosis; stipulis * * * foliis circa 6 poll. long. 2¼ poll. lat. membranaceis glabris ovato-lanceolatis acuminatis; floribus racemosis, pedunculo elongato; bracteis foliaceis deciduis lineari-oblongis a flore distantibus; floribus 1½ poll. long. extus aurantiacis puberulis; floris tubo pollicari basi ventricoso superne sensim dilatato; sepalis subcoriaceis oblongis obtusis ecarinatis imbricatis partibus obducatis glabris rubro-aurantiacis; petalis conformibus paulo brevioribus; corona fauciali duplici filis extimis petalis dimidio brevioribus flavidis capitatellis apicem versus tuberculatis; filis interioribus dimidio brevioribus linearibus; corona media e tubo paulo infra medium emergente basi membranacea tubulata superne filamentosa filis subulatis elongatis erectis; gynophoro glabro basi pentagono alato, alis ad parietes tubi ita transeuntibus ut tubus basi quinque locularis evadat; ovario oblongo flavido puberulo; stylis basi a sese remotiusculis; fructu * * *

Junction of Rivers Beni and Madre de Dios, (2089.) *P. spinosæ* Poeppig arcte affinis differt tamen petiolis eglandulosis, coronâ mediana, filamentis basi liberis aliisque notis.

PASSIFLORA NEPHRODES, sp. nov. § *Granadilla.* Fruticosa ramis hirsutis teretibus sulcato-striatis; petiolis pollicaribus eglandu-

losis; foliis 3 poll. long. 2¾ poll. lat, membranaceis cordato 3-lobis lobis ovatis acutis, medio multo majore; stipulis pollicaribus foliaceis dimidiato-reniformibus aristatis grosse serratis; pedunculo * * * bracteis * * * floribus diametro 2 pollicaribus; sepalis oblongis hirsutis cornutis; petalis sepalis parum brevioribus; corona fauciali filamentosa filis extimis petalis parum brevioribus, cæteris numerosissimus brevioribus capitatellis; corona media * * * ovario globoso hirsuto * * * Unduavi, 8,000 ft. (494).

Passiflora? Mapiri, 2,500 ft. (2525). Foliage only collected.

Malesherbsia linearifolia, Poir. Near Valparaiso, Chili (2419).

Carica microcarpa, Jacq. Hort. Schœn. iii. 32, t. 309, 310. Yungas, 6,000 ft. (1764); 4,000 ft. (1766).

Carica? Yungas, 4,000 ft. (1765).

Carica? Junction of Rivers Beni and Madre de Dios (1762).

CUCURBITACEÆ.

Luffa cylindrica (L.), Rœm. Syn. fasc. 2, 63. Beni River (2064). Cultivated and spontaneous.

Melothria Cucumis, Vell. Fl. Flum. i. t. 70. Guanai, 2,000 ft. (2066).

Melothria Fluminensis, Gardn. in Hook. Journ. Bot. i. 173. Junction of the rivers Beni and Madre de Dios (2067).

Melothria Hookeri, Cogn., in D.C. Monog. Phan. iii. 588. Mapiri, 5000 ft. (2065).

Gurania spinulosa (Pœpp. and Endl.), Cogn. Diag. Cucurb. i. 17. Mapiri, 5,000 ft. (2061; 2062); 2,500 ft. (2063); (*Anguria spinulosa*, Pœpp and Endl.)

Gurania? Beni River (2662).

Cayaponia pentaphylla, Cogn. loc. cit. 760? Reis 1,500 ft. (2069).

Cayaponia coriacea, Cogn. in Mart. Fl. Bras. Cucurb. 79. Falls of Madeira, Brazil (497).

Cayaponia Tayuya (Vell.), Cogn. in D.C. Monog. Phan. iii. 772. Mapiri, 5,000 ft. (495).

Cyclanthera pedata (L.), Schrad. Index. Sem. Hort. Gott. 1831. Yungas, 4,000 ft. Cultivated (491).

Cyclanthera Matthewsii, Arn. in Hook. Journ. Bot. iii. 280? Guanai, 2,000 ft. (2071).

Cyclanthera, probably undescribed. Yungas, 6,000 ft. (2059).

CYCLANTHERA (?) RUSBYI, spec. nova. Caulis paulo ramosus, sulcatus, puberulus. Petiolus 8-10 mm. longus. Folia submembranacea, ovata, 8-10 cm. longa, 4-6 cm. lata, acuta vel obtusa, supra papillosa, subtus pubescentia, margine remote denticulata, sinus basilaris late rotundatus. Cirrhi bifidi, graciles, elongati. Pedunculus communis 1-3 cm. longus, multiflorus. Pedicelli 2 mm. longi. Corolla virescens, segmentis triangularibus, acutis, 1 mm. longis. Pedunculus fructiferus crassis, 1-2 cm. longus, striatus. Fructus oblique ovoideus 4-5 cm. longus, 2 cm. crassus. Aculei numerosi, compressi, 1 mm. longi. Yungas, 6,000 ft. (2589); Unduavi, 8,000 ft. (2068). If correctly referred to this genus, appears nearest related to *C. subinermis*, Cogn.

Elaterium Amazonicum, Mart. in Cogn. Diag. Cucurb. ii. 55. Yungas, 6,000 ft. (2070).

ECHINOCYSTIS MACROCARPUS, spec. nova. Caulis sulcatus, sparse villoso-hirsutus. Petiolus gracilis, sulcatus, longe villoso-hirsutus. Folia suborbicularia, 10-15 cm. lata, 5-loba, utrinque puberula, lobis acutis vel acuminatis, sinus basillaris rotundus, 2-3 cm. latis. Pedunculus communis masculus gracilis, sparse villosus, 10-15 cm. longus. Inflorascentia mascula paniculata. Cirrhi ramosi elongati. Fructus sessilis, 5-6 cm. longus, 2 cm. latus, horride aculeatus. Aculei inæquales, majores 2 cm. longi. Rostrum conicum, acuminatum, sparse aculeatum, tomentosum. Yungas, 6,000 ft. (2060). Apparently nearest *E. longispina*, Cogn.

Alsomitra Brasiliensis, Cogn. in Mart. Fl. Bras. Cucurb. 115. Junction of Rivers Beni and Madre de Dios. (547).

BEGONIACEÆ.

Begonia pleiopetala, A. D.C. Ann. Sci. Nat. (4) xi. 121. Unduavi, 8,000 ft. (682).

Begonia Weddelliana, A. D.C. loc. cit. ex. descrip. Yungas, 6,000 ft. (679).

Begonia, related to the preceding. Ingenio del Oro, 10,000 ft. (681).

Begonia, apparently allied to *B. Boliviensis*, A. D.C. Yungas, 6,000 ft. (683).

Begonia fagopyroides, Kunth et Bouché, Ind. Hort. Berl. 1848. Yungas, 4,000 ft. (686).

Indian Bread Root.

An article recently appeared in the "Waterloo Observer," N. Y., which has some botanical interest, relating to a root which the Seneca Indians called *Ooktehaw* a century ago, and from which they made bread. The ground nut, *Apios tuberosa*, was well known, and formed the totem of the potato clan of the Senecas a hundred years earlier. This was the principal edible root of the New York Indians. Mr. Horatio Hale properly considered the word generic, and thought that Ooktehaw bread was made from roots in general. Mr. George H. Harris, of Rochester, N. Y., now thinks differently, and claims that the root in question is a Western plant, which he terms *Psoralea esculenta*, otherwise the Prairie Potato, or Bread Root. I suppose it to be a plant which I have seen, but do not know it by this name, nor do I think any *Psoralea* has been reported in New York. As the root was in common use it could not have escaped the notice of botanists and others, whatever its name. Mr. Harris claims that a similar root was used by the early settlers in the Genesee Valley, and was called *O-ki-tah-ak-gua*, or Bread Root. There may be a mistake both in the meaning of the word and the plant.

The ground nut is not now common, and I do not find it in my list of Onondaga names, but *Oke-ta-ha* appears, applied to the beet, and meaning simply a root. *Ook-ta-ha-wa-ne* is the artichoke, and means Big root. The Cayugas called the turnip *Ok-te-ha*. This will show the generic use of the word mentioned by a prisoner among the Senecas, and, as Mr. Hale supposed, Ook-te-haw bread was that made of any edible root. Of those in use here the ground nut was held in the highest estimation, but it was not the only kind eaten in time of need.

W. M. BEAUCHAMP.

Geographical Distribution of Phlox bifida.

The marked increase in late years of local collectors in the region east of the Mississippi River has tended to greatly increase our knowledge of the geographical range of the native species ot this region, especially those that have a tendency to be local in their distribution. As a result, new stations for our rarer plants are constantly coming to light; but yet, with our ever-increasing knowledge in this direction, we are compelled to admit that there are certain species that still must be considered as local in their distribution, and of this class is *Phlox bifida.*

I am inclined to think this species more limited in its geographical range than has been generally supposed.

In fact, I feel justified in concluding that this very distinct *Phlox* is confined to Illinois. The writer would be glad to receive any information that would support or destroy such conclusion.

In Gray's "Flora of North America," its habitat is given as "Prairies of Illinois and Missouri;" but I am inclined to think the Missouri habitat very questionable.

In Tracy's "Catalogue of Plants of Missouri," *Phlox bifida* is included, but no locality is mentioned, and it is inserted on the ground of the Missouri habitat in "Gray's Manual, fifth edition."

From the fact that the species was named by Prof. Beck, who collected in the neighborhood of St. Louis, Mo., at one time, I was led to address Prof. Trelease of that city, with the idea of ascertaining, if possible, its existence in that locality. In answering, he said, in looking over Dr. Engelmann's check-list of Missouri plants, he could find no mention of it, nor was it in Riehl's herbarium of Missouri plants at Shaw's Garden.

It would hardly seem possible that such an enthusiastic and accurate botanist as Dr. Engelmann, with the opportunities of his many years residence in St. Louis, would have overlooked it if native in that vicinity. Though a rare plant in Illinois, it is found in several widely separated localities. Patterson's catalogue gives the following localities: "Common on lake shore, south of Chicago, Babcock; Kankakee County, Hill; Peoria, Brendel; Mason and Cass, Mead; Menard, Hall; Union, Forbes." The lake shore habitat makes it possible that it might extend along the shore either into Indiana or Wisconsin.

It is very abundant in a deep, rocky defile known as "Rocky Glen," about two miles distant from Peoria. It is a profuse bloomer, and in May the steep sides are clothed with the delicate star-like flowers. About a mile distant from this locality it grows more sparingly on a steep, sandy bank. As neither locality is susceptible of cultivation, it would appear as if destined to exist here forever. FRANK McDONALD.

Botanical Notes.

New Localities.—Collections made during the past two or three seasons have shown me several instances in which the limits of species as given in the "New Manual" must be extended.

During the summer I collected *Rubus cuneifolius* in the vicinity of Bridgeport, Conn., growing on dry rocky hillsides, and a few miles back in the country, *Callitriche deflexa*, var. *Austini*, by the roadside. Both of these are recorded from New York and should be looked for in Connecticut, but are not mentioned by Gray. *Diodia teres*, is given in the "Manual" as extending from New Jersey to West Illinois, Missouri and Texas. This is quite abundant on the beach at Black Rock, near Bridgeport. Another stray, which I understand is becoming common in the east, is *Plantago Patagonica*, var. *aristata*. This was found at Bridgeport this season.

At Evanston, Ill., last spring, I found a bed of *Plantago Virginica*, which the "Manual" gives as extending from southern New England to southern Illinois and south. It grew in a field near Lake Michigan and if introduced is well established.

Cycloloma platyphyllum occurs rather abundantly in drifting sand in a field near the shore to the south of Evanston.

The latest, and to me the most interesting, find was made near the last of August at Edgemoor in northern Indiana. There I found *Utricularia resupinata* growing in abundance along the edge of a marshy pond. The nearest station, according to the "Manual," is Presque Isle, Lake Erie. L. N. JOHNSON.

Evanston, Ill.

A new Locality for Asplenium ebenoides.—I have to report a locality for *Asplenium ebenoides* which, to the best of my knowledge, has not been reported. The locality is "Culp's hill," Gettysburg, Pa. I found it growing among *Camptosorus rhizophyllus* and *Polypodium vulgare*, which species are abundant there, frequently covering large rock surfaces. *A. ebeneum* also abounds.

S. L. POWELL.

JOHNS HOPKINS UNIVERSITY, Baltimore, Md.

A Distribution of Weeds.—Dr. Halsted, who has made a study of weeds for a number of years, proposes to issue a century of these pestiferous plants. This collection will be made up from scores of reports of American botanists upon the twenty worst weeds in their locality, and therefore will be representative of the various regions of the United States. In the future it is expected to supplement this collection with one of the seeds of the same species, and continue the work until the weeds of America are fully represented in the economic and other herbaria of the country. While more particularly designed for the agricultural colleges and experiment stations, this collection of injurious plants cannot but be of interest to the general systematic botanist. The price is not yet fixed upon, but will not be far from eight dollars for the first century. Dr. Halsted desires that all who are interested will send their word of encouragment to him. The work is a vast one and entirely one of love for the cause of a better understanding of our weeds by the one who is engaged in the enterprise, namely, Byron D. Halsted, New Brunswick, N. J.

Reviews of Foreign Literature.

Introduction to Fresh-water Algæ, with an Enumeration of all the British Species. M. C. Cooke. (8vo. pp. 334; 13 plates, London, 1890. International Scientific Series).

This is a convenient little laboratory book, giving illustrations of all the genera of fresh-water Algæ known in Britain, and as these are nearly all common to North America it will be found a useful adjunct to Mr. Wolle's publications in this country. The subject is treated in a popular, rather than a strictly scientific manner. Directions are given for the collection and preservation of the plants, their methods of growth and reproduction are described and their phenomena of spontaneous movement commented upon.

Dr. Cooke does not take much stock in the recent classification of Algæ proposed in Bennett and Murray's "Cryptogamic Botany," nor in what he is pleased to call the "dual hypothesis" of the nature of lichens, both of which are denounced in no uncertain language. This and other considerations have induced a scathing review of the book by Mr. Geo. Murray in the "Journal of Botany," for August, in which such useful phrases for reviewers with a bias are employed that we reproduce some of them here:

"The author of this book," says Mr. Murray, "deserves the highest credit for his good intentions. * * * The plan of the book and the idea of producing it are most creditable to Mr. Cooke, but he should have induced someone else to carry the matter into effect. * * * Over the ground covered by the list of subjects there is, indeed, wanted a good, trustworthy, popular guide. Mr. Cooke would have been the better for such a guide."

In defense of his work, Dr. Cooke contents himself with reprinting Mr. Murray's review in "Grevillea," and pointing out the fact that Mr. Murray is an officer of the Botanical Department of the British Museum, while he, himself, is similarly attached to Kew.

N. L. B.

Index to Recent American Botanical Literature.

Abies grandis. A. D. Webster. (Garden, xxxviii. 291, illustrated).

Acrostichum Yatesii, Sodiro. R. P. Luis Sodiro. (Anales Univ. Quito. iv. No. 29).

A new fern, related as *A. succisæfolia*, Thouars, discovered on Mt. Pinchincha, Ecuador, and dedicated to Dr. Lorenzo G. Yates.

Asclepias tuberosa. (Vick's Mag. xiii. 309, 310, illustrated).

Asplenium blepharodes, a new Fern from Lower California. D. C. Eaton. (Zoe, i. 197. Plate VII).

A species allied to *A. parvulum* collected by Mr. Brandegee at Sierra de Laguna in January, 1889, differing from that species in its stouter habit, and especially in its beautifully ciliate indurium, that of *A. parvulum* and other allied species being nearly or quite entire.

Azolla Caroliniana. (Proc. Nat. Sci. Assn. S. I., Oct. 9th, 1890.

At the meeting held on the above date, Mr. Thomas Craig showed specimens collected near Clove Lake, Staten Island, where it had been introduced by Mr. Samuel Henshaw in 1885. The plant is evidently thoroughly established in its northern home.

Barbacenia squamata. J. G. Baker. (Gard. Chron. viii. 408, fig. 81).

Botanical Notes, 1889. J. H. Carruth. (Trans. Kansas Acad. Sci. xii. 43, 44).

Notes on *Vitis palmata*, *V. æstivalis*, *Acer nigrum*, which is claimed as a species distinct from *A. saccharum*, *Polygonum erectum*, *Physalis lanceolata* and *Quercus tinctoria*.

Bromeliaceæ—New Guatemalan. J. G. Baker. (Journ. Bot. xxviii. 305, 306).

The following are described as new: *Æchmea* (*Hohenbergia*) *Isabellina*, *Æ.* (*Lamprococcus*) *Donnell-Smithii*, *Æ.* (*Platyæchmea*) *squarrosa* and *Tillandsia* (*Allardtia*) *sparsiflora*, all from the collections of Capt. J. Donnell Smith.

Bulletin No. XIX, Agricultural Experiment Station, Cornell University. (Pamph. 8vo. pp. 13, Ithaca, N. Y., 1890).

In this bulletin may be found reports upon various fruit blights, and figures representing leaves attacked by *Fusicladium dendriticum*, *Entomosporium maculatum*, *Taphrina deformans*, and *Glæosporium venetum*.

Cacti—Among the. C. H. Shinn. (Vick's Mag. xiii. 302-307, illustrated).

An account of the cactus flora of the Southwest, with figures of *Cereus giganteus*, *C. Pringlei*, *Echinocactus Emoryi*, *Opuntia Tuna*, *O. angustata*, *O. versicolor* and *Agave Palmeri*.

Cactus Family—The. Gerald Hastings. (Am. Garden, xi. 472-475, illustrated).

Cereus chloranthus, *Opuntia Tuna*, *Pelecyphora aselliformis*, var. *concolor*, and fruit of *Cereus Greggii* are figured.

Cactus Landscapes. Geo. Vasey. (Am. Garden, xi. 468-470, illustrated).

Figures are given of *Opuntia Whipplei* and *O. angustata*.

Cactuses In-doors and Out. (Am. Garden. xi. 459-467, illustrated).

This article also includes notes upon several cactus-like *Euphorbias.* The illustrations include *Cereus giganteus*, *Nopalea coccinellifera*, *Mamillaria micromeris*, *M. macromeris*, *Echinocactus Visnaga*, *E. Emoryi*, *E. hexædrophorus*, *Opuntia Rafinesquii*, *Leuchtenbergia principis, Anhalonium fissuratum, Euphorbia meloformis, Rhipsalis salicornoides, Pereskia Bleo.*

Cactuses Under Culture. M. De Loup. (Am. Garden, xi. 470-471, illustrated).

Contains figures of *Cereus nycticaulis* and *Opuntia Ficus-Indica.*

Calochortus Madrensis. J. G. Baker. (Gard. Chron. viii. 391, fig. 78).

Canchalagua (*Erythrea venusta*). C. R. Orcutt. (West Amer. Sci. vii. 45, 46).

Chilenische Tertiærpflanzen. H. Engelhardt. (Abhand. Natur. Ges. Isis, 1890, 3-5).

A list of Tertiary plants from Chili.

Contributions to American Botany. XVII. Sereno Watson. (Proc. Amer. Acad. Arts and Sci. xxv. 124-163. Reprinted).

This includes: I—Miscellaneous notes upon North American plants, chiefly of the United States, with descriptions of new species. *Sisyrimbrium humifusum*, Vahl, is referred to *Arabis* under the same specific name. The following new species are described: *Arabis Howellii*, from Oregon and California; *Streptanthus Lemmoni*, *S. barbatus*, *S. Arizonicus* and *S. campestris* from California and Arizona, and a synopsis of the known species of *Streptanthus* given; *Silene multinervia* and *S. Schockleyi* from California; *Trifolium Catalinæ* from Santa Catalina Island; *Astragalus Forwoodii* from the Black Hills; *Vicia Thurberi* from the Rocky Mountains and *V. Hassei* from California; *Eriogynia uniflora* from Montana, and under this a discussion of the relations of the several genera recognized by Maximowicz as distinct from *Spiræa*, maintaining with that author that the Asiatic *Neillia* is distinct from *Physocarpa*, and that "*N. capitata*, Greene, can in no way be separated from the ordinary *P. opulifolia.* His *N. malvacea* also, judging from the characters, appears to be a common form of *P. Torreyi;*" but Dr. Watson has not seen *N. malvacea;* if this view be correct, that the two genera are distinct, and we are inclined to consider it so, then, apparently, the American shrubs must go to the genus *Episcotorus*, Raf., which has priority over *Physocarpa; Eremiastrum Orcuttii*, from California; *Aster Forwoodii* and *Artemisia Forwoodii*, from the Black Hills; *Lepidospartum latisquamum*, from Nevada; *Hieracium nigrocollinum*, from the Black Hills; *Camassia Howellii*, from Oregon; *Ruppia occidentalis*, from British Columbia.

There are also discussions of a number of the species first characterized by the author in the sixth edition of Gray's Manual.

II. Descriptions of new species of plants, from northern Mexico, collected chiefly by Mr. C. G. Pringle, in 1888 and 1889. Eighty-seven species are here characterized, as well as the following new genera: *Sargentia*, in Rutaceæ; *Rhodosciadium*, in Umbelliferæ, and *Jaliscoa*, in Compositæ. N. L. B.

Coprinus from Montana—Notes on a Species of. J. B. Ellis and B. M. Everhart. (Microscope, x. 129-131, Pl. IV).

A figure and description of *Coprinus sclerotigenus*, found growing from a black sclerotium in sheep manure, near Great Falls, Montana.

Cornus Baileyi. J. M. Coulter. (Garden and Forest, iii. 464, fig. 58).

Distribution of Boracic Acid Among Plants. J. S. Callison. (Journ. Elisha Mitchell Sci. Soc. vii. 14-20).

Drought-Enduring Trees. J. L. Budd. (Garden and Forest, iii. 475, 476).

Notes upon introduced shrubs and trees which have thriven in Iowa during the past three years of short rainfall, when native species hardly held their own.

Elm—The American. (Garden and Forest, iii. 462, illustrated).

Attention is called, in this article, to the type of tree with short lateral branchlets covering the main limbs and trunk.

Epilobium—A New. Wm. Trelease. (Zoe. i. 210, 211).

E. Parishii of the *E. coloratum* group collected by Mr. Parish at San Bernardino, Cal., Nov. 1889, Nos. 2094 and 2095, and by Mr. Brandegee, near Todos Santos, Lower California.

Ferns—Notes on Native. F. H. Horsford. (Garden and Forest, iii. 516).

Notes on *Aspidium cristatum*, and its variety *Clintonianum*, *A. Thelypteris*, *A. aculeatum*, var. *Braunii*, *A. Noveboracense* and *A. fragrans*.

Floras of the United States and British America—A List of the State and Local. N. L. Britton. (Reprinted from the Annals of the New York Academy of Science, Vol. V).

At last students of the geographical distribution of North American plants have a complete index to works of reference on that subject. Considering that all the "notes and short lists of observations" have been excluded, one is astonished at the great number of titles that Dr. Britton has accumulated, there being no less than 791, consecutively numbered. The work is the extension and perfection of the series of papers begun in Vol. VIII. of THE BULLETIN, by Messrs. Gerard and Britton, entitled "Contributions towards a List of the State and Local Floras of the United States." The floras are divided into four classes, lettered from A to D, namely, those of lists without exact localities (205), those giving stations (286), those giving stations with notes or occasional descriptions (174), and descriptive lists (91). A few are not classified. The order of arrangement is by countries, States and counties. Aside from the reference value of this list it furnishes in itself some interesting historical facts.

The six Eastern States furnish 106; five Middle States and D. C., 121; six Southeastern States, 55; seven Southern States, 57; eleven of the Western States, including the Indian Territory, 191; Upper Missouri Region, 12; Rocky Mountain Region, 26; Great Basin Region, 15; Pacific Coast, 66; British America, 123, and Transcontinental Surveys, 10. The largest number credited to single States are New York, 65; California, 48; Massachusetts, 45; Pennsylvania, 30, and Ohio, 28.

Apparently the first list published was No. 232, A "Catalogue of Plants," observed by John Bannister in Virginia, published in London in 1668. The next, by Johannes Clayton, relates to the same region and was published in Leyden from 1739 to 1743. But then it is to be remembered that the Virginia of that day included many of our present States. Other old-timers were one in 1749-53 by Cadwallader Colden, relating to Orange Co. (N. Y.) plants, one by Rev. M. Cutler, Boston, 1785, referring to plants of the Eastern States; Flora Caroliniana by Thomas Walter in 1788, and Muhlenberg's Index to the Flora of Lancaster Co., Pa., published in 1793. Doubtless a critical examination of the periods when this kind of list-making was most active, and a study of the causative influences, would prove highly interesting and profitable. H. H. R.

Fungi—A Few New. J. B. Ellis and S. M. Tracy. (Journ. Mycol. vi. 76, 77).

Eleven new species are described.

Fungi—New North American. J. B. Ellis and B. M. Everhart. (Reprint from Proc. Acad. Nat. Sci. Phil., July 29, 1890).

Descriptions of one hundred and one species are given, with many interesting criticisms.

Grapes—A Classification of American. T. V. Munson. (Garden and Forest, iii. 474, 475. Also Bull. No. 3, Div. Pomology, U. S. Dept. Agriculture).

In this arrangement the author divides the genus, as recognized by him, into two sections, viz.: Euvitis, Planchon, and Puncticulosis, Munson. The first section is divided into seven series, called respectively Ripariæ, Occidentales, Coriaceæ, Labruscæ, Æstivales, Cordifoliæ and Cinerascentes. Section two is represented by the eighth series only, denominated Muscadiniæ. Twenty-five species are recognized. The following are as new: *Vitis Doaniana*, *V. Arizonica*, var. *glabra*, *V. Girdiana*, *V. Lincecumii*, var. *glauca*, *V. Simpsoni*, *V. Virginiana*, *V. cinerea*, var. *Floridana*, *V. Blancoii* and *V. Munsoniana*, Simp. Interesting and valuable notes are included in regard to hybridization and geographical range and distribution.

Grasses of the Southwest. Plates and Descriptions of the Grasses of the Desert Region of Western Texas, New Mexico, Arizona and *Southern California. Part I.* Geo. Vasey. (U. S. Dept. Agric., Div. Botany, Bull. No. 12, 4to, 50 plates, Washington, 1890).

This is the most extensive contribution towards the illustration and description of our native grasses hitherto issued, and is an exceedingly valuable contribution to botanical science, as well as to that of agriculture. The drawings, made chiefly by Mr. Wm. R. Scholl, are accurate and artistic, most of the species being given natural size and accompanied by enlargements of the flowers. They are reproduced by lithography. From an introductory note we learn that this constitutes one-half of the first volume of a work to be entitled "Illustrations of North American Grasses." Volume II. is to include the grasses of the Pacific Slope. We hope an extension of the plan may lead to a volume on the Eastern grasses. N. L. B.

Heteropsis Jenmani. D. Oliver. (Ic. Plant. Plate 1949).

A new Aroid, native of British Guiana.

Hollyhock Disease.—A New. E. A. Southworth. (Journ. Mycol. vi. 45-50, plate iii).

The new fungus here figured and described is called *Colletotrichium Althææ.*

Huckleberries and Blueberries—Gaylussacia and Vaccinium sp. E. Lewis Sturtevant. (Trans. Mass. Hort. Soc. for Year 1890, part 1, 17-38).

In a discussion regarding the common names the author says: "I have never yet heard the words Whortleberry and Bilberry used by uneducated country people, and yet these words are given prominence in American cyclopedias and by American authors. The popular method, in New England at least, seems to be to apply the name of Huckleberries to those kinds in which the seeds are prominent in the chewing, and Blueberries to those of other kinds in which the seeds are not noticeable, regardless of the real color." The twenty-one edible species are treated in the author's usual exhaustive manner regarding synonomy, bibliography, common names, etc., both for America and the Old World.

Isaria and an Attendant Pachybasium—Note on a Minnesota Species of. Conway MacMillan. (Journ. Mycol. vi. 75, 76).

Lavatera—Is it an introduced Plant? T. S. Brandegee. (Zoe, i. 188, 190).

Leucophyllum Texanum. C. S. Sargent. (Gard. and For. iii. 488, 489, fig. 63).

List of Native Ferns and Allies Grown at Cinchona. Author—Hart? (Ann. Rept. Pub. Gardens and Plantations of Jamaica, for year ending Sept. 30, 1890, 7, 8).

Læflingia squarrosa. T. S. Brandegee. (Zoe, i. 219, 220).

Madrona—The. (Garden and Forest, iii. 509, 510, illustrated).

An account and figure of *Arbutus Menziesii.*

Medicinischen Pflanzen von Alabama—Die. Carl Mohr. (Pharm. Rundsch. viii. 240-243).

A list of medicinal plants in the orders Ranunculaceæ to Leguminosæ inclusive.

Mucronoporus Andersoni, n.sp. J. B. Ellis and B. M. Everhart. (Journ. Mycol. vi. 79).

Found under bark of an oak log, Newfield, N. J., April, 1890.

North American Sphagna—Contributions to the knowledge of. C. Warnstorf. Bot. Gaz. xv. 127-140, 189-198, 217-227).

It is due to the earnest efforts of Mr. Edwin Faxon that the author has been supplied with an abundance of material for this revision. Twenty-three species are recognized. *S. Garberi* is reduced to *S. compactum*; *S. serratum*, Austin, becomes *S. Trinitense*, Muller; *S. riparium*, Angstr. is added; *S. Floridanum* (Austin) Cardot is upheld; *S. acutifolium* is split up into numerous forms and varieties and six of its varieties raised to specific rank; var. *quinquefarium*, Braith., equals *S. quinquefarium;* var. *plumulosum*, Milde, becomes *S. subnitens*, Russ. & Warn.; var. *fuscum*, Sch. is *S. fuscum*; var. *robustum*, Russ., is *S. Russowii*; var. *tenellum*, Schpr., is *S. tenellum*; var. *gracile*, Russ., is *S. Warnstorfii*, Russ.; *S. sedoides* is reduced again to a variety of *S. Pylæsii*, Brid.

Since the distribution of Austin's fine exsiccatæ, the North American Sphagna have been critically studied by Braithwaite, (1880) Lindberg (1882) Lesquereux and James (1884) Cardot (1887) the number of species fluctuating from 16 to 27.

E. G. B.

Notes on the History of Botany. T. J. W. Burgess. (Pamph. 8vo., pp. 19).

This is the author's reprint of an interesting paper read before the Hamilton Association, March 13, 1890.

Opuntia Fruit as Food. Walter Dalton. (Am. Garden, xi. 467).

Pancratium fragrans. (Gard. Chron. viii. 359-360, fig. 71).

Phœnix dactylifera—Germination of. Mrs. J. E. Dixon. (Bull. Sci. Lab. Denison Univ. v. 8, 9, pl. A. f. 1, 2, 3).

Phyllocactus Ackermanni. (Am. Garden, xi. 448, 449, fig. 1).

Potato Scab—A Bacterial Disease. H. L. Bolley. (Agric. Sci. iv. 243-256).

A record of experiments tending to prove that the potato scab is due to the presence of a specific *Bacterium.*

Provisional Host-Index of the Fungi of the United States. Part II, Gamopetalæ—Apetalæ. W. G. Farlow and A. B. Seymour. (pp. 53-133, Cambridge, 1890).

Red Wood—The. (Gard. Chron. viii. 302-304, figs. 60-63).

A popular account of *Sequoia sempervirens*, with notes upon its introduction and growth in Great Britain.

Report of the Chief of the Section of Vegetable Pathology for the Year 1889, *U. S. Dept. Agric.* B. T. Galloway. (Pamph. pp. 35, illustrated. Author's Edition).

In addition to an account of the economic work of the Division there is a description, with colored plate, of a mignonette disease: *Cercospora Resedæ*, Fckl.

Report of the Botanist on the Grasses and Forage Plants and the Catalogue of Plants (*of Nebraska*). Charles E. Bessey and Herbert J. Webber. (Pamph. 8vo. pp. 162. Lincoln, Neb., 1890. Extracted from the Report of the Nebraska State Board of Agriculture for 1889).

This valuable report contains papers by Mr. Webber on "The Grasses of Central Nebraska" and "The Grasses of Northwestern Nebraska;" on "Grasses of Box Butte and Cheyenne Counties" by Mr. J. G. Smith; by Mr. Webber on the several collections of grasses exhibited at the State Fair held in 1889. The number of wild species is given as 106 and the introduced species 22. There are also papers on a variety of agricultural topics connected with other forage plants.

Mr. Webber contributes the "Catalogue of the Flora of Nebraska." This is arranged in the philosophical manner of beginning with the lower organisms and ending with what the author considers to be the most highly organized—in his case the Compositæ—the arrangement of the Flowering Plants following that of Luerssen. There are 1,890 species and varieties enumerated, curiously coincident with the date of publication. Of these, thirty-nine are Protophyta, ninety-five Zygophyta, twenty Oophyta, 691 Carpophyta, forty-seven Bryophyta, seventeen Pteridophyta and 981 Anthophyta. In nomenclature the oldest specific name is quite consistently maintained and the original author cited in parenthesis. Common names are given in detail and localities cited for all the rarer plants. The list is an exceedingly important contribution to geographical botany, and the thanks of botanists are due Dr. Bessey and Mr. Webber for the labor and care of its preparation. N. L. B.

Report of the Botanical Department of the Experiment Station, Kansas State Agricultural College, for the Year 1889. W. A. Kellerman and W. T. Swingle. (Reprint, pp. 213-364, from 2d Ann. Rep. Exp. Sta.).

This paper consists of (1) Report on the Loose Smuts of Cereals, containing detailed descriptions of *Ustilago Avenæ, U. Tritici, U. Hordei* and *U. nuda*, illustrated by nine plates. Comprehensive tables of synonymy of these four closely allied species are given. (2) Experiments in Crossing Varieties of Corn, including a bibliography of the subject. (3) Preliminary Study of the Receptivity of Corn Silk.

Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado in Arizona. C. Hart Merriam. (North Am. Fauna No. 3, U. S. Dept. Agric. Divn. Ornithol. and Mammal., Pamph. 8vo. pp. 136, illustrated. Washington, D.C., Sept. 11, 1890).

Several important botanical contributions are to be found in this publication. Under the heading "Remarks on the geographic distribution of species characteristic of the several zones of the San Francisco mountain region in Arizona" are lists of plants found respectively on the summit, sub-alpine or timber line zone, (Central) Hudsonian or Spruce zone, (Central) Canadian or Balsam Fir zone, Neutral or Pine zone, and Piñon zone of the mountains. Also a short account of the flora of the Desert of the Little Colorado below. In regard to the origin of the boreal flora of the mountains the author accepts the theory that during the recession of the ice in glacial times these plants were left stranded and as the temperature became warmer and warmer they ascended the mountain until they found a temperature which suited their needs. The desert flora is supposed to have come by way of the Grand Cañon of the Colorado from the deserts of western Arizona—a theory which only an intimate acquaintance with the physical features of the region can criticise. Brief notes upon some of the botanical features of the Grand Cañon are also given. Finally a list of the forest trees is appended, which enumerates fourteen species and varieties. The work is well illustrated by maps which show the areas and limits of the various zones above mentioned.

Rhododendron Forest in New Hampshire—A. Walter Deane. (Am. Garden, xi. 595, 596, illustrated).

Describes a visit to a forest of *Rhododendron maximum* on the farm of S. M. Follansbee, Fitzwilliam, N. H.

Rose Rusts. A. B. Seymour. (Am. Garden, xi. 609, illustrated).

Description and figures of *Phragmidium mucronatum* and *P. speciosum.* Also *P. mucronatum*, var. *Americanum*, which the author thinks is probably identical with the European *P. Rosæ-alpinæ.*

Sequoia Forests of the Sierra Nevada. Frank J. Walker. (Zoe, i. 198-204, with map).

Mr. Walker estimates that 37,500 acres of *Sequoia* forest remain in the Sierra Nevada, of which about 13,500 are owned or held by the Government.

Some Attractive Native Plants. L. H. B. (Am. Garden, xi. 597-599, illustrated).

Polygala paucifolia, Cypripedium pubescens, Lithospermum canescens, Chimaphila maculata and *Sarcodes sanguinea* are figured.

Spiral or elliptically wound Tracheids in the axilla of small decayed Branches in Trees. P. H. Dudley. (Journ. N. Y. Micros. Soc. vi. 110-114; four figures).

Stinking Smut of Wheat—Preliminary Experiments with Fungicides for. W. A. Kellerman and W. T. Swingle. (Bull. No. 12, Kans. State Agric. Coll. Exp. Sta., Pl. 1).

Contains representation of *Tilletia fœtens.*

Tupelo Tree—The. (Gard. and Forest, iii. 485, 486).

A popular account of *Nyssa aquatica*, illustrated by an engraving of a group in eastern Massachusetts.

Trillium—The Snowy. A. D. Selby. (Journ. Columbus Hort. Soc. v. 36, Pl. iii).

Trillium nivale is described and figured. It is stated to be in full bloom in Ohio in March.

Zonaria variegata, Lam'x—Notes on. Herbert Maule Richards. (Proc. Amer. Acad. Arts. and Sci. xxv. 83-92, one Plate. Reprinted. Contrib. Crypt. Lab. Harvard Univ. xiii).

This is a study of the frond-structure of an alga of the order Dictyotaceæ, collected by Professor Farlow in Bermuda and a discussion of the relation of this genus to *Dictyota*, *Taonia* and *Padina*.

Proceedings of the Club.

The regular meeting was held Tuesday evening, October 14th, with twenty-two persons present, Rev. L. H. Lighthipe in the Chair.

The Secretary presented the following amendment to the Constitution:

Resolved, That Article XXII of the Constitution be changed to read, "The regular meetings of the Club shall be held on the second Tuesday and *last* Wednesday of the month" instead of *fourth Wednesday* as it now stands.

"An account of the Autumn Flora of Southeastern Virginia" was given by Mr. Arthur Hollick, illustrated by specimens. The paper will appear in a later number of THE BULLETIN.

Miss Gaskin reported *Asplenium montanum* at Sam's Point, New York.

The second regular meeting of the month was held Wednesday evening, October 24th, the President in the Chair and twenty-three persons present.

Mr. Frank Johnson was elected an active member, and Dr. Lorenzo G. Yates and Prof. Luis Sodiro were elected corresponding members.

The committee on amendment to Constitution reported favorably thereon.

The paper of the evening "New or Noteworthy North American Phanerogams" was given by Dr. N. L. Britton.

Dr. Wheelock remarked on the two species of *Pentstemon*, *P. frutescens*, of Arctic America, and *P. crassifolium*, Shutt. of Florida, a hitherto undescribed plant.

Miss Stabler reported a peculiar growth of ærial roots in Swamp Maple as noticed by her at Great Neck, L. I. The trees in several instances were decayed 10 or 15 feet above the ground, and roots 1½ inch in diameter had been sent out from above through this decayed growth to the ground 15 feet below.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. XVII.] New York, December 9, 1890. [No. 12.

Notes on Corticium Oakesii, B. & C., and Michenera Artocreas, B. & C.

By George James Peirce.

Plate CX.

In the order Thelephoreæ there are many interesting species of fungi, of which the greater number grow upon the bark of trees. I wish to speak in this paper somewhat in detail of the structure of the species first described by Berkeley and Curtis as *Corticium Oakesii.*

In and upon the bark of certain species of Salix the mycelium of *Corticium Oakesii*, B. & C., spreads, forming at last a hymenium which is nearly if not quite sessile. It is shaped like a flat bowl, greyish or flesh colored, and consists of a margin of rather closely compacted hyphæ, and of the hymenial surface proper which is composed of somewhat club-shaped basidia separated from one another by hairs which are branches of ordinary hyphal threads, and constitute true paraphyses.

The paraphyses, which are short and also somewhat club-shaped, are thickly beset at their tips with short, bristle-like processes (see figure a) upon which, at certain stages at least, conidial spores may be borne. After the paraphyses have attained to such a bristly developement that they have the appearance of test-tube brushes, some of them (see figure d) begin to grow again at their tips. Those threads which do not resume their growth lengthwise become stouter and more abundantly clothed with bristles than the others. The second growth is always separated from the first by a more or less pronounced constriction (see figs. d, e, f, g) in and below which, as would be expected, the older bristles are found. The second growth is generally the last, and when it ceases bristles are again produced as before. If, however, growth is still again resumed, a third set of bristles is sometimes produced at the new tip (see figs. e, f). It is noticeable that the bristles of the second crop, although usually longer and larger than those first formed, are always fewer, generally only four. Only rarely are there more than three or four bristles in the third set.

In the second crop five or six bristles may be formed, but only four ever reach any considerable size. The paraphyses increase correspondingly in size and length. Four of the bristles grow large and long, and, though retaining in great part their thinness of wall, become erect, and bear finally on their tips single, large, oval spores. These fully grown paraphyses are therefore basidia whose sterigmata have been developed from simple, small bristles. Both the erect, upward-pointing sterigmata, and the spores which they bear, are surprisingly large. The sterigmata are about 16μ long by 4μ broad, while the bristles to which they correspond are only about 3μ long and of proportionate breadth. The spores (24μ by 16μ) are clear, granular, flesh-colored, with a nucleus, (which, however, is not always evident), and when ripe, are fairly thick-walled. The sterigmata, being thin-walled and slender, are very fragile, so that sometimes it is no easy matter to secure preparations of them. When the basidial spores are pretty well developed, the surface of the hymenium becomes yellowish and powdery, instead of close, smooth, and pallid, as it is while the plant is sterile or bearing only conidia.

When the plant is not producing basidial spores, that is, when it is young or after basidial spores have ceased to form, the bristles of the paraphyses often bear at their tips clear, highly refringent, colorless, spherical bodies about 0.82μ in diameter, which are doubtless conidial spores. There are, therefore, two fertile stages in the life history of *Corticium Oakesii*, the conidial and the basidial.

The basidial spores are therefore like the conidial spores in that they are both non-sexual, borne on bristles, or upon sterigmata which have been derived by development from bristles; but they are unlike the conidial spores in that they are only four in number, large, and colored. The only extraordinary thing about them is that they are borne on basidia which are modified and developed paraphyses whose bristles have become larger, longer, fewer, and more erect. The development of the spores is similar to that described and figured by De Bary in his "Morphology and Biology of the Fungi, Mycetozoa, and Bacteria," page 64, for *C. amorphum*, Fr.

The paraphyses branch only occasionally and the branches are always given off considerably below the tip, from that part which is still clear and hypha-like. Those branches which I saw were short, but rather large, (see fig. b).

Among the brush-like paraphyses I found numerous threads which resemble the moniliform filaments in the hymenia of *C. amorphum*, Fr. Upon each thread of this sort are from one to six bead-like structures (see fig. c). The one on the tip is generally more constricted than the others. When there is only one bead on a hypha it may become so much constricted from the rest of the thread as to be almost separate therefrom. In this stage it faintly suggests a spore.

Having found some moniliform hyphæ in *C. Oakesii* which resembled those of *C. amorphum*, I examined *C. amorphum* in order to find, if possible, some trace of the bristle-brushes of *C. Oakesii.* In this I was unsuccessful, and, so far as I know, these bristly paraphyses may be considered the characteristic possession of *C. Oakesii.* For this reason, therefore, as well as on account of certain differences in external appearance, etc., I am convinced that *C. Oakesii* is not, as had been supposed by earlier writers and more recently by Mr. A. P. Morgan in his "Mycologic Flora of the Miami Valley," "the same as *C. amorphum*," nor even a variety of the species.

In Grevillea (iii, 172), Cooke gives a brief but suggestive description of the structure of *C. Oakesii* as seen in two American specimens which he examined. He speaks of finding "incipient asci," "large sporidia," and "nodolose paraphyses," and concludes that the "spicules," or bristle-like processes of the paraphyses, are the stalks of conidial spores.

This appears to be the first paper in which the paraphyses with spicules were correctly described and their true nature pointed out. The "incipient asci" and "large sporidia" were, however, later recognized by Cooke to be basidia containing oil globules resembling sporidia. The "nodulose paraphyses" are, apparently, the moniliform paraphyses which I have just described.

The only other notice of *C. Oakesii* which needs special attention is in the paper by Massee, on the Thelephoreæ, published in the Linnæan Society's Journal, xxv, 120. He says, in *C. Oakesii*, or, as he calls it, *Aleurodiscus Oakesii*, "in addition to normal tetrasporous basidia, which are rare, there are numerous elliptical gonidia produced singly on thick gonidiophores, whereas in *Aleurodiscus Micheneri* I have found large colored gonidia."

In the specimens that I examined, normal basidia were common enough, although not always in fruit. I have seen all the stages from the young and bare basidia to those bearing four ripe spores on erect sterigmata, as I have already described and figured. I could find no trace of "thick gonidiophores," and the only normal thing which at all resembled them was, as I have said, those hyphæ whose tips were so constricted as to be beadlike. But comparing these with Massee's figures, it is evident that these are altogether too simple and commonplace to be what he means. I saw a single basidium, large, thick, and somewhat irregular, upon which was a single stout sterigma bearing a spore (see fig. h). The occasional abortion of two or three of the four sterigmata has often been observed in other genera of fungi. If wholesale abortion had taken place in Massee's specimens he would naturally have found that tetrasporous basidia were rare, and that "large elliptical gonidia produced singly on thick gonidiophores" took their place. Unless such a thing had occurred, or unless Massee was so fortunate as to get specimens of a stage different from any that I have seen, I can understand neither his descriptions nor his figures. Surely the few moniliform hyphæ, thin-walled, slender and clear, are not the gonidiophores of which he speaks, and we must choose between these and aborted basidia if we are to accept his account.

Just as these observations were ready for publication, my attention was called to a paper by Patouillard entitled, "Quelques champignons de la Chine récoltés par M. l'Abbé Delavy," which came out in the July number of the "Revue Mycologique." In this paper, under the head of *Aleurodiscus Oakesii*, B. & C., he says that the sterile cells of the hymenium are of two sorts; some are simply basidia which have not yet attained their full development; the others, much more slender, and attenuated at both ends, bear at their tips more or less spiniform protuberances; that these last might easily be taken for paraphyses, were it not that he had been able to determine that they appear in the young specimen at the same time as the basidia and never precede them; that it is, therefore, impossible to recognize in these organs the homologues of those filaments which are found in the thecæ of the Discomycetes. He says, further, that in the American specimens which he examined, the spine-bearing cells were about the same in size as sterile basidia. He therefore concludes that these are basidia which never can produce spores, and that they have become sterile because of some other function of which we are ignorant.

Now, since I have seen many of these spine-bearing cells in specimens so young that not a basidium could be seen, these spinous cells do precede the basidia. Furthermore, I have seen, and in the figures I have tried to show, the development of basidia from these spine-bearing cells themselves. It is by the resumption of growth on the part of some of these bristly cells that the basidia are formed, and from the delicate little bristles the thin-walled, large sterigmata are subsequently developed.

From my own observations, which can be confirmed at any time by an examination of the preparations which I have made of the various stages in the development of the basidia and bristle-cells, I am convinced that, in spite of the general accuracy of his account, it must be wrong on this point; that what have always been called paraphyses are paraphyses, and that from these the basidia are directly developed.

Another genus even more remarkable than *Corticium*, also belonging to the Thelephoreæ, is that called by Saccardo, *Michenera*. There is only one species known in the United States, and this is apparently not common. Like the *Corticia*, it grows upon the bark of trees. It possesses a well-marked and almost, if not quite, sessile hymenium, flat-bowl-shaped, whitish or flesh-tinted without, and rufous within. There is a decided margin to the bowl, formed of closely compacted hyphæ, as in some *Corticia*, and the hymenium itself, when ripe, ceases to be hard and smooth, and becomes powdery from the escape of the ripened spores.

The difficulties attending the study of this interesting fungus, *Michenera Artocreas*, B. & C., have been great. Its rarity, combined with its remarkable structural peculiarities, have been the cause of many confusions of nomenclature, and each student seems to have taken pleasure in re-naming this form. Berkley and Curtis seem first to have specifically described it in their "Cuban Fungi" under the name of *Michenera Artocreas;* but subsequent writers have variously styled it *Artocreas Micheneri*, *A. Michenera*, *Aleurodiscus Michenera*, and *A. Micheneri.* In addition to the confusion in synonomy, the necessarily imperfect descriptions of the earlier botanists have been accepted without thorough verification, and from this source have come some of the errors which I hope to disprove in this paper.

For the sake of clearness, I will begin my description with the young hymenium. It is made up of simple paraphyses, long, slender, and smooth, unicellular, erect, parallel and tolerably close together. Immediately beneath them, that is, at the base of the hymenium, are the ordinary mycelial hyphæ of the plant, running horizontally or obliquely and interlacing among themselves. It is, of course, from these that the paraphyses spring. Presently the tips ot some of the hyphæ become erect, swell, and force their way upwards between the paraphyses. The swollen tip becomes more granular than the rest of the hypha. Later each tip is divided off by a cross partition (see fig. k, *Michenera Artocreas*, B. & C); it increases in size; its walls become thickened, and at the same time, by the contraction of the upper part of the cell, a long, tapering, lash-like structure is formed at the topmost point. Finally, the neck of the tip-cell, which has now grown to be flask-shaped, is closed by the thickening of its walls.

In the meantime, within the cell thus produced at the outer end of a hyphal thread, a spore has been forming. This spore is large, granular, and either colorless or faintly flesh-tinted. When the spore is ripe, the mother-cell, with its spore inside, breaks off at the partition which divided it from the parent hypha, and, together with many other similar spore-containing cells, lies rather loosely among the filamentous paraphyses until carried away by the wind, or perhaps by some other agent. When the spores are fully ripe, the long, lash-like appendages of the mother-cells show a tendency to curl spirally and to shrivel. It would be interesting to notice whether this has anything to do with the dissemination of the spores.

The spores are formed so uniformly that one may speak of three distinct layers in the hymenium. First, the somewhat loosely reticulated mycelium, which is overlaid by the more closely compacted hyphæ, from which the paraphyses and sporophores arise; then the dense layer of spores in their flask-shaped mother-cells with upward pointing flagella.

Since it was generally agreed to retain *Michenera Artocreas* among the Hymenomycetes, an effort was made to explain the presence of the flask-shaped bodies which I have just described, on the supposition that they were the spores of some fungus parasitic upon a *Corticium;* and this view was supported by the discovery in other places of basidia and spores which had the same appearance as the basidia and spores of a *Corticium.* But I find no evidence that the flask-shaped bodies are the spores of a parasitic fungus, for the hyphæ which bear the spores are the same in form, size and color as the ordinary mycelial hyphæ of the plant, and may with care be traced vertically in the body of the hymenium for some distance.

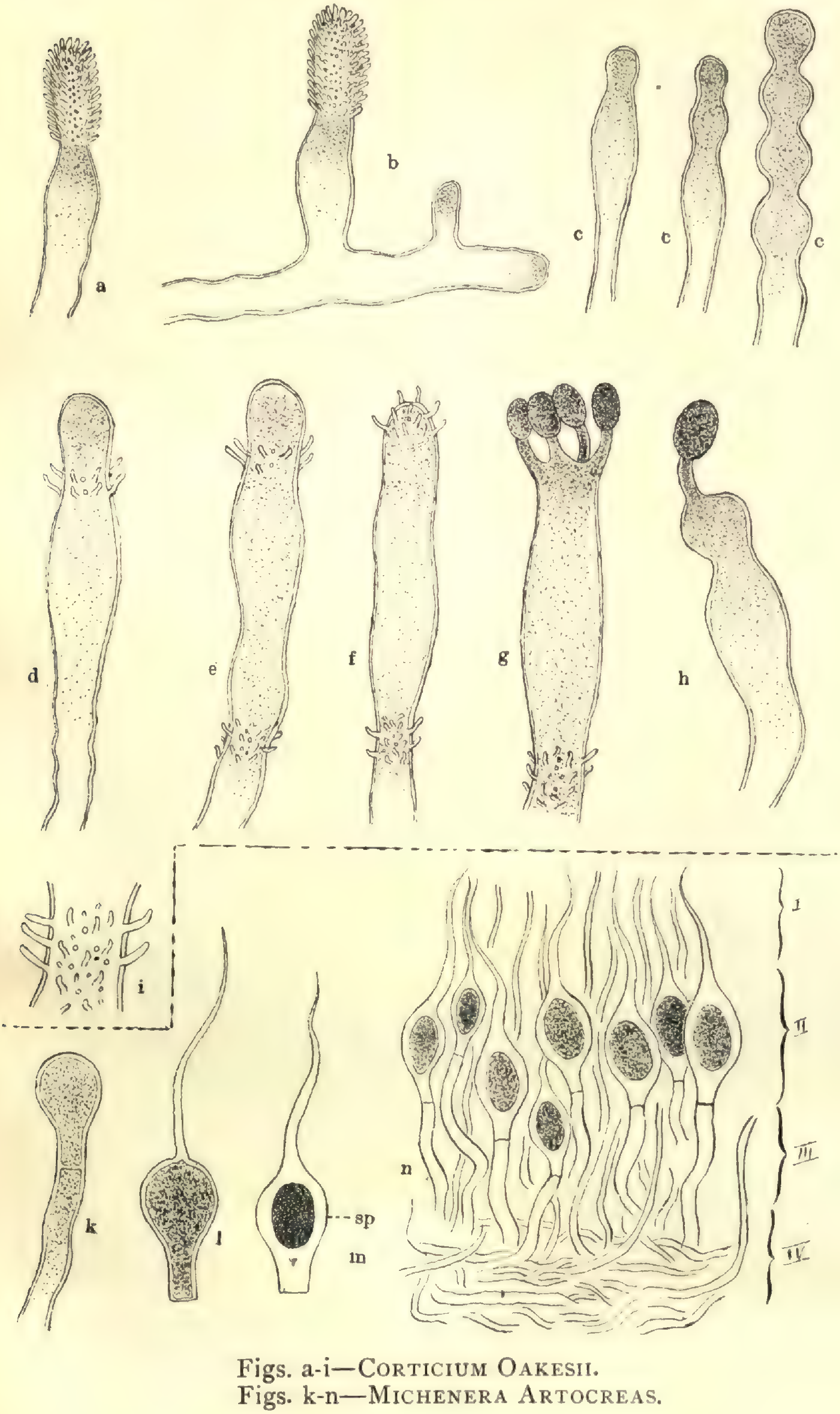
Generally, in cases of fungi parasitic upon larger or more complex forms, the hyphæ run transversely and rather near the surface of the host, and can, therefore, in sections or dissections, be distinguished or even separated from the host. Such cases as the Hypomyces, which grow on the larger Agaricini, present this character. In *Michenera*, on the contrary, the spore-bearing hyphæ run approximately parallel, deep down into the hymenium, they form nothing like a sheet, and are not much reticulated until they are near the mycelium of the plant. These flask-shaped bodies can be nothing else than large conidial spores.

If one searches in the literature, one will find in Fig. 4, Plate

VI., of Brefeld's "Untersuchungen aus dem Gesammtgebiete der Mycologie," Heft VIII, a figure which closely resembles the structure of the hymenium in *Michenera Artocreas.* This is a figure of *Nyctalis parasitica*, the nature of whose "chlamydospores," has been considered a matter of some doubt.

Basidia and spores have been described as being produced by *Michenera Artocreas.* In the hymenia, the only spores which I have ever seen were those flask-shaped conidia which I have already described. I have seen no traces either of basidia which had not yet developed sufficiently to bear spores, or of old basidia which had ceased to be spore-bearing. Yet on some specimens, growing near the *Michenera,* but, so far as I have observed, never connected with it, are often found large, low, flat hymenia in which at proper times basidia and spores are produced. These hymenia have attained their large size by the confluence of several small ones. This a rather common occurrence in the Corticia. In these hymenia the spores are large, oval, granular, and borne on long, slender sterigmata which spring from thin-walled basidia. The paraphyses, though slender are somewhat club-shaped, instead of filamentous like those of *Michenera Artocreas.* In all these respects the hymenia are Corticium-like. It is not now possible to assert positively that these hymenia have no organic connection with those which undoubtedly belong to the *Michenera;* for it is always a difficult matter to trace a mycelium continuously for more than a short distance. But it is my opinion, formed after careful examination of the specimens at my disposal, that the mycelium which produces hymenia in which are basidial spores, is not continuous with that which sends up hymenia in which are the spores borne in flask-shaped mother-cells. I believe that those hymenia which contain basidia and basidial spores are, as they seem to be, the hymenia of some species of Corticium, and that they have nothing whatever to do with *Michenera Artocreas.*

Never having seen, in any hymenium which was undoubtedly one of *Michenera Artocreas*, any traces of basidia or of spores which looked as if they might have been borne on basidia, I am led to believe that the basidial stage of *Michenera Artocreas* either does not exist at all, or that it is so completely replaced by the



Figs. a-i—Corticium Oakesii.
Figs. k-n—Michenera Artocreas.

conidial stage (represented by the flask-shaped cells, which I have described, and the spores therein) that it very seldom appears.

The chief character by which modern mycologists recognize *Michenera Artocreas*, B.&C., is the flask-shaped, flagellate conidia. Fresh material of this plant, and if possible an abundance of it, would doubtless disclose to the student much more of interest than I have been able to make out from the herbarium specimens which have been my only material for examination. I have had the good fortune, however, to be able to study all the specimens of *Michenera* in the Curtis collection of Fungi, and also all the other specimens of *Michenera* in the Cryptogamic Herbarium of Harvard University.

In studying both *Corticium* and *Michenera* I have found Böhmer's Hæmatoxylin a valuable aid in bringing out structural characters. It must be observed, however, that acid preparations, such as glycerine and acetic acid, are impossible with this stain; for the acid gradually destroys the color after changing it to a disagreeable reddish hue. On the other hand, alkaline solutions produce a purple, flocculent precipitate. Pure glycerine is the most convenient mounting medium, and if the sections, or macerated fragments, be *slowly* run up from water to glycerine no shrinkage ensues, the color is unchanged, and the preparations may be kept indefinitely.

To Dr. Farlow, professor of Cryptogamic Botany at Harvard University, who very kindly put at my disposal the specimens which I have studied, and who has helped me by counsel and by criticism in preparing this paper, I wish to convey my grateful acknowledgments.

EXPLANATION OF PLATE CX.

Corticium Oakesii, B.&C.

a.—Simple bristly paraphysis.

b.—Showing method of branching of paraphyses.

c.—Moniliform or nodulose paraphyses resembling those of *C. amorphum*, Fr.

d.—Young paraphysis which has resumed its upward growth.

e.—Paraphysis in which second crop of bristles has been formed and growth is continued.

f.—Paraphysis, with a second crop of bristles, which will probably go on growing.

g.—A paraphysis which has been developed into a basidium, four bristles only being formed in the second crop, and these bearing large, oval, granular spores. The first crop of bristles is seen below.

h.—A basidium with only one sterizma and one spore.

i.—Detail of a crop of bristles, showing manner of extrusion, position, etc.

Michenera artocreas, B.&C.

k.—A hypha which has swelled at its tip. The tip is already cut off from the parent hypha by a cross partition. The tip is more granular than the rest of the filament.

l.—A tip which has broken from the hypha after the lash-like process from its top has been developed. The walls are still thin and the spore has not been formed.

m.—A tip cell whose much thickened walls enclose a dark granular spore (sp). The flagellate tip shows some tendency to curl. The neck of the mother-cell is almost completely closed by the thickening of its walls.

n.—A section through the hymenium of *M. artocreas.*

- I.—Layer in which filamentous paraphyses are the principal elements.
- II.—Spore-layer, mother-cells of spores lying loosely among filamentous paraphyses.
- III.—Layer of spore-bearing hyphæ which are separated from each other by paraphyses.
- IV.—Mycelium at base of hymenium, showing that both paraphyses and sporophores are continuous with ordinary mycelial hyphæ.

CRYPTOGAMIC LABORATORY,
Harvard University, June, 1890.

New or Noteworthy North American Phanerogams.—III.

BY N. L. BRITTON.

RANUNCULUS PORTERI, n. sp. § Batrachium. Submersed, apparently several feet long, freely branching. Leaves petioled, the petioles ½′ to 1′ long, and dilated at the base, the blade about 1½′ in diameter repeatedly ternately divided into linear or capillary segments; the upper shorter and broader; flowers white, 3″ to 4″ broad, peduncled; achenes 6 to 12 in a head, obliquely oval, compressed, somewhat pubescent, marginless, very nearly 1″ long, beakless or with a mere apiculation, irregularly rugose transversely; receptacle pubescent.

I noticed this plant in Dr. Porter's Herbarium a year or so ago. The accompanying label has only "Henry's Fork, No. 1062; *Ranunculus*, entirely immersed." It was collected on the Hayden Survey of the territories, but I cannot place the exact locality.

The species differs from any form of *R. aquatilis* with which I am acquainted, in its much broader and fewer leaf-segments and larger achenia. I sent it to Mr. Baker at Kew, who thinks it not related to any European form of that plant, remarking that "no European form ever shows so much transition between floating leaves and capillary leaves as this does." Its affinity with *R. aquatilis* is evident, however, from its beakless, rugose pubescent achenia and hairy receptacle.

I refer here, with considerable hesitation, the plant collected by Professor Greene at Ione, Cal., June 7, 1889, and the species may occur in British Columbia.

Capsella procumbens (L.), Fr. Mant. Nov. Fl. Suec. i. 14 (1832). Reichenb. Ic. Flor. Germ. et. Helv. ii. t. xi. f. 4221 (1837).

Lepidium procumbens, L. Sp. Pl. 643 (1753).

Hutchinsia procumbens, D.C. Prodr. i. 178 (1818).

Capsella elliptica, C. A. Meyer, Verzeich. Pflanz. Cauc. 194 (1831).

Hymenolobus divaricatus and *H. erectus*, Nutt. in T. & G. Fl. N. A. i. 117 (1838).

Capsella divaricata, Walp. Rep. i. 175 (1842).

I was first led to investigate the relations of the Old and New World plants which have been described under the above-cited names from finding them all united in the Kew Herbarium. An examination of the specimens there preserved and subsequent study of an extensive suite at home have convinced me that they are all one species, adding another to the list of circumboreal plants. In Europe it extends south to the Mediterranean region, in Asia to Thibet, and it apparently occurs also in Australia. On our own continent it has been found in Labrador by Mr. J. A. Allen (along the seashore, Dead Islands, lat, 52° 48′) and it is widely distributed over the far west as far south as Utah and Lower California.

Hypericum Canadense, L. var. *majus*, Gray Man. Ed. 5, 86 (1867).

A study of this plant in the field and herbarium leads me to think that it has good claim to specific rank. Its characters of lanceolate, acute, 5 to 7-nerved leaves, greater size and longer and sharper calyx-lobes seem quite constant. I have not seen it growing with the typical *H. Canadense*. If they could be found together, important evidence might be obtained. I do not propose here to elevate it to specific rank, but only to call attention to it in the hope that it may be investigated. Its range is given by Prof. Coulter (Bot. Gaz. xi. 110) as "Canada to Pennsylvania, Illinois and about the Great Lakes," but by Watson and Coulter in the 6th edition of Gray's Manual "L. Superior, Robbins, S. New York and southward." These are contradictory. Specimens from Vermont, New Jersey, Illinois and Iowa are preserved in the Columbia Herbarium.

Calandrinia pygmæa, A. Gray, Proc. Amer. Ac. viii. 623 (1873).

Talinum pygmæum, A. Gray, Amer. Journ. Sci. xxxiii. 407 (1862).

There is an Australian species so named by F. Mueller in Fragm. Phytog. Austr. i. 175 (1858) and recognized by Bentham in Flora Australiensis. I would therefore propose for the American plant the name C. GRAYI.

Crotalaria retusa, L., was collected by Mr. Blodgett on Key West, Florida, many years ago. It does not appear to have been reported from the United States before, but might be expected, as it grows throughout tropical America.

LOTUS HELLERI, n. sp. (*Hosackia Purshiana*, Torr. & Gray, Fl. N. A. i. 327 in part). Erect, annual, divaricately branching 1° to 2° high, finely pubescent or glabrous, leafy; branches ascending, 6′ to 8′ long, slender; stipules; leaves sessile, 3-foliolate; leaflets linear or linear-oblong, acute, entire, the terminal one slightly longer stalked than the lateral ones which are somewhat inequilateral; peduncles 1-flowered, axillary, slender, about 8″ long in fruit, leafy-bracted at the summit; keel yellowish about 3″ long; wings yellowish, tinged with pink; standard pale pink; calyx lobes linear, equalling or slightly exceeding the tube; pod linear, glabrous, 1′ to 1¼′ long, 1½″ wide, acute, 5 to 6-seeded, deflexed at maturity.

North Carolina (Schweinitz) Mecklenberg Co. (M. A. Curtis) Salisbury, Rowan Co. (A. A. Heller). Named in commemoration of Mr. Heller's recent collecting trip in North Carolina, on which a number of rare and interesting plants were obtained. *Lotus Americanus*, (Nutt.) Bisch. Litt. Ber. Linnæa, 1840, 132, (*Hosackia Purshiana*, Benth.), with which this has been confounded, has larger and broader leaflets, is more villous, and has the calyx more deeply cleft. I believe that it has not been found east of the Mississippi, but ranges from Minnesota to Sonora. The widely distributed plant of the Pacific Coast, also mixed up with *Lotus Americanus*, appears to me quite distinct, as Nuttall made out, describing it as *Hosackia elata* (In T. & G. Fl. N. A. i. 327) and there may be, as he also thought, several other closely related species in California and the Northwest.

Psoralea Reverchoni, S. Wats., Proc. Amer. Acad. xxi. 449, originally described from specimens collected by Mr. Reverchon in western Texas, in 1877, was also found by Dr. Palmer in the Indian Territory, 1868 (No. 72).

Psoralea corylifolia, L. is in Dr. Chapman's Herbarium, ticketed "Appalachicola, introduced." It is an Asiatic species, close to *P. dentata*, DC. of southern Europe.

Cassia crotolarioides, Kunth, var. *leucophylla*, Benth. There is a specimen so determined in the Kew Herbarium, collected by Prof. Mosely in the Grand Canon, Colorado Plateau, Arizona, 1884. The species is known in north Mexico, and its occurrence in this region might have been expected.

Ilex montana, T. and G. var. MOLLIS (A. Gray). *Ilex mollis*, A. Gray, Man. Ed. 2. Leaves as in the type, but pubescent beneath. Burgoon's Gap, Penn. (Porter). Pocono Plateau, Penn., collected by myself on the Torrey Club Field Excursion, June 7–10, 1889.

This plant was first referred to *Ilex dubia* (Don.), B. S. P. Prel. Cat. N. Y., but on comparison with typical specimens of this species from the Alleghanies of North Carolina, Georgia and Alabama, it appears hardly possible that this disposition of it is correct. *I. dubia* has broadly ovate, oval or even obovate leaves, which are rarely acuminate and commonly obtuse, and are much more densely and softly pubescent beneath.

Ilex mollis was founded on the Pennsylvania plant, and the southern species subsequently referred to it. I am maintaining *dubia* as the specific name of the latter on the authority of Dr. Gray, who probably saw a type of it. But from Don's description of *Prinos dubius*, (Gard. Dict. ii. 20), this would not be certain, and he says it occurs from New Jersey to Carolina, while the plant which I know as *dubia* is not reported north of North Carolina.

Ilex verticillata (L.) A. Gray, var. *tenuifolia*, Torr. Fl. North. States, 338 (1824). This variety with thin, obovate leaves, glabrous, except a slight pubescence along the midvein on the under surface, and with mucronate-tipped, appressed teeth, originally collected by Dr. Torrey in the cedar swamp at New Durham, has recently been collected by Mr. W. M. Whitfield at Mt. Washington, Berkshire Co., Mass.

Var. *padifolia* (Willd.), T. and G. in S. Wats. Bibliog. Index, i. 220, is distinguished from the type by its smaller, thicker (almost coriaceous), broadly oval or nearly orbicular leaves. The original specimen in Herb. Torrey came from Lake Erie. The plant is common on the Pocono Plateau of Pennsylvania.

Professor Trelease, in his review of North American species of *Ilex* in Trans. St. Louis Acad. Sci. Vol. V., does not recognize either of these varieties, but they appear to me certainly well-marked enough to warrant consideration.

SPIRÆA VIRGINIANA, n. sp. A glabrous shrub, the branches forming long wands, erect or reclining, 1°–4° long. Leaves oblong or slightly oblanceolate, thin, obtuse or short-pointed at the apex, rounded or cuneate at the base, 1½′–2′ long, 5″–8″ wide, green above, pale beneath, entire or with a few low serrations in the upper half; petioles 2″ long; pedicels and peduncles pale and glaucous; flowers about 2″ broad, in terminal compound corymbs 1′-3′ across; calyx teeth 5, triangular, blunt, about the length of the short-campanulate tube, distinctly glaucous; petals 5, white, ovate-orbicular, obtuse, stamens 15–20, persistent; styles 5–6; follicles in the specimens examined 5–6, apparently sterile, included in the persistent calyx.

On damp rocks along the Monongahela River, Morgantown, West Virginia, collected by Dr. C. F. Millspaugh in flower, June 20th, 1890, and in apparently imperfect fruit late in September. Collected also by Mr. G. R. Vasey in the mountains of North Carolina, 1878.

Spiræa betulæfolia, Pall. and *S. corymbosa*, Raf., have much longer follicles exserted beyond the calyx, broader, thicker and dentate leaves, and are different in habit. Rafinesque published a number of species in his New Flora, but none of them can apply to this one.

LUDWIGIA ALTERNIFOLIA, L., var. LINEARIFOLIA, n. var. Two or three feet high, divergently branched, the branches ascending. Leaves linear, elongated, 2′–4′ long, 1½″–4″ wide, acute; flowers solitary in the axils of the upper leaves or bracts, yellow; sepals ovate-lanceolate acute, narrower than those of *L. alternifolia*; branches and both sides of the leaves somewhat pubescent. Petals apparently remaining on the plant longer than those of *L. alternifolia*, which, as Dr. Millspaugh observes, commonly fall away when the plant is shocked.

Appearing very distinct from typical *L. alternifolia*, but presumably but a variety of it. From the description it may be the *Rhexia linearifolia*, Poir. in Lam. Encycl. vi. 2, said to come from Carolina.

Leontodon hirtus, L., long known from the ballast grounds of the eastern seaports, is becoming more widely adventive. It has recently been collected in Southern New Jersey by Dr. J. E. Peters, at Cold Spring Harbor, Long Island, by Mr. Geo. D. Hulst, and on Vancouver Island, British Columbia, by Prof. Macoun. It certainly claims recognition as an adventive plant.

Populus heterophylla, L. Another locality for this rare tree in the Middle States has been discovered by Rev. L. H. Lighthipe, near Woodbridge, Middlesex Co., N. J. The stations now known for it at the north, besides those given in my "Catalogue of Plants from New Jersey," and its somewhat wide distribution on Staten Island, are Northport, Long Island, and Guilford, Conn., as recorded by Professor Sargent in his Forestry Report in the Tenth Census.

Eriocaulon Körnicikanum, Van Heurck et Muell. Arg. Obs. Bot. 101 (1870). This species does not appear to have been alluded to by any American author. I know nothing more about it than the description given by the above named authors. The plant was collected in eastern Texas by Chas. Wright, and is mentioned here only to call it to the attention of our botanists. It can hardly be Drummond's No. 409 (second coll.), which I take to be *E. Benthami*, Kunth., although without sufficient examination to warrant certainty.

Cyperus phæocephalus, Griseb. Plant, Lorentz. 216 (1874), may be reported from mountains between Mazatlan and Durango, Mexico, collected by Mr. Forrer in 1887. Specimens were sent me by Prof. Greene. It occurs along the Andes of South America from Ecuador to Argentina. (Spruce, 5,904; Mandon, 1,394; Rusby, 100).

CYPERUS BLODGETTII, n. sp. Section Mariscus. Perennial, from a tuberous thickened base, 8′-9′ high. Roots fibrous; leaves linear, 3′-4′ long, about 1″ wide, glabrous, smooth on the edges; culm sharply triangular; involucre of about three leaves, 1′–2½′ long; inflorescence of 1–3 dense globose heads, 5″–8″ in diameter; spikelets 20–40, 6–10-flowered, the lowest glume empty, the others fertile; glumes keeled, oval or ovate, obtusish, strongly about 9-nerved, about ½″ long; achenium oblong, about two-thirds the length of the glume, triangular; falling away with the glumes from the rachis at maturity; rachis strongly scarred with the bases of the flowers; stamens three?

Key West, Mr. Blodgett (Herb. Torrey and Herb. Gray).

I went over this species with Mr. Clarke at Kew in 1888 and we decided that it must be new. Mr. Clarke, maintaining that *Mariscus* is distinct as a genus from *Cyperus*, proposed calling it *M. arenicola*, and if this view is to be adopted, the plant may bear this name. But I have not been able to agree with him in this respect. The species appears nearest to *C. Grayii.*

The Flora of the Summit of Mt. Monadnock, N. H., in July.

Mt. Monadnock lies in Cheshire County, in the southwestern part of New Hampshire, and can be reached in four hours from Boston, Mass., thus bringing a most interesting botanical region within easy access to lovers of botany. A few words as to the vegetation on the immediate summit may prove of interest. The mountain is 3169 feet high and rears its bald head into the sub-alpine region, thus presenting botanical features much resembling those about the Half Way House, on Mt. Washington, New Hampshire.

I visited the top of Monadnock, July 22nd, 1889, on a beautiful clear day. The thick woods that clothe the slopes of the mountain cease within a half mile of the summit and the bold, bare rocks, with many an overhanging cliff, afford no easy ascent, though a rough pathway has been traced to the top for visitors to the Mountain House, which lies nestled among the trees a mile from the summit. The view from the summit is magnificent. Dense forests, sparkling lakes, rolling hills, and towns half hidden among the trees, offer a restful picture to the eye. The plants found on the hoary head of the old mountain scarcely exceed a foot in height. The prominent feature consists of *Juncus trifidus*, which grows in small, dense, tough patches between the rocks, and was in good fruiting condition when I gathered it. I was obliged to use my trowel as a hatchet, to hack out pieces of the hard, dry sod. *Poa serotina*, which varies so much in different localities, formed a turf several feet square, by a small pool of surface water, within a few yards of the very summit. The grass, which was of special interest to me, however, and which I met for the first time, at this spot, was *Poa nemoralis*, [*Poa cæsia*, var. *strictior* of the Gray Manual, 5th edition]. It formed a dense sod of several square feet, in a few spots, between the massive boulders. I feasted my eyes upon this interesting grass, which is certainly not common, and stretched out at full length upon it to eat my lunch. The pretty *Arenaria Grœnlandica* was in full flower and grew some distance down the mountain side, forming small patches of snowy white. *Solidago Virga-aurea*, var. *alpina* was very abundant, in full bloom, growing here and there in profusion. The plants were from 2 to 6 inches in height and the radical leaves were fully developed. These leaves varied very much in shape, from almost orbicular with margined petioles to narrowly spatulate and pointed. On the damp slopes about the summit, *Rhodora* was abundant in fruit and, by a clear, cool spring of crystal water, but a minute's scramble down the rocks, I found *Ledum latifolium*, *Carex canescens*, var. *alpicola* was growing from the mountain top to nearly as far down as the Mountain House, while *Potentilla tridentata* was very abundant on the rocks everywhere, in full flower. I found this plant growing abundantly in an open meadow in Jaffrey, N. H., on August 11th, the fruit having fully matured. Creeping up very close to the summit and just perfecting its bright red berries, was *Vaccinium Vitis-Idæa*. It is called Mountain Cranberry and certainly makes an excellent sauce. Expertus dico. A small form of *Eriophorum gracile* was growing among rich sphagnum by a small pool.

These were the phænogamous features of the top of the mountain, within a few rods of the very highest point, and though they do not embrace plants of any special rarity, yet they were of interest to me, as being just what one would expect to find at such an elevation. The absence of any shade whatever and of any rich soil, to any extent, of course excludes many plants that otherwise would be found. On the way up the mountain, in the rich woods, I collected *Ribes rubrum* in fruit, and *Streptopus amplexifolius* was very abundant. Its coral red berries make it a very attractive plant.

WALTER DEANE.

The Pinnatifid Leaves of Nasturtium Armoracia.

In Gray's Manual, revised edition, the leaves of this species are described as follows: "Root-leaves very large, oblong, crenate, *rarely* pinnatifid." My observations on the plant, conducted during a long and bitter struggle with it in my garden, lead me to conclude that the pinnatifid leaves are not rare, but periodical in their appearance. The order of the foliation of the plant, as noted by me for the past three years, is as follows: Early in the spring the leaves are small, dissected or dissected pinnatifid. Those next in order are larger and have broader lobes, and after a short time these in turn are succeeded by the broad or summer leaves. Often a single plant will have a series of leaves showing a complete gradation from the dissected to the broad blade. The broad leaves are characteristic of the summer state of the plant, and I have never seen a pinnatifid leaf in midsummer. Early in the fall the new leaves as they appear have more deeply crenate-toothed margins, and as the season advances, many of the plants send out truly pinnatifid leaves again. There are indications that this would be the case with all if the season of growth were longer, for the buds of all usually contain undeveloped pinnatifid leaves when the frost kills the foliage. In October of the present year, every plant, in over forty which I examined, had some of the leaves pinnatifid. As the plant appears in our gardens there is no assignable cause for so marked a change of foliage. The history of the plant, so far as I can find out, is silent as to its habits in the wild state, but it prefers, in this country, rich wet ground, rarely thriving on high and dry soils. This fact, taken in connection with others, as the habits of allied plants, notably *N. lacustre,* and that many aquatic exogenous plants have dissected leaves, would lead to the conclusion that our plant had been an aquatic at some period of its history. My own conclusion in regard to it is that it was originally an aquatic, but under a gradual change of condition of its surroundings, probably the drying up in summer of the shallow water in which it lived, it acquired a form suitable for emersed conditions, became amphibious as it were. Possibly it would be better to suppose a marshy habitat, subject to fall and winter overflow, but as ponds and lakes usually preceded marshes it is perhaps best to trace this interesting case of heredity, if such it be, to them rather than to marshy ground. CHAS. A. DAVIS.

Alma, Mich., Oct. 25, 1890.

Botanical Notes.

Appointment of Dr. Thos. Morong to the Curatorship of the Columbia College Herbarium.

After an absence of over two years in southern South America, during which time he has collected a very large and valuable representation of the plants of that region, Dr. Morong has returned in health and safety. All botanists will bid him cordial welcome, both on his safe return and his entry upon a new sphere of usefulness and activity. The trustees of Columbia College have appointed him to be Curator of their herbarium, a position which has not been occupied since the death of Mr. P. V. LeRoy. In this appointment an important step has been made in the progress of American systematic botany. N. L. B.

Hepaticeæ Britannicæ Exsiccatæ, Carrington and Pearson; Fas. IV., Nos. 216-290; price 1£ 10s., Manchester, Eccles, England. As many of the British species are common to America, we take pleasure in commending these neatly prepared sets. They are bound in cloth, large octavo. We may state here that the hepatic collections of C. F. Austin were purchased by Messrs. Carrington and Pearson, so that it is to them that we must look for comparisons with many types of American species.

New Localities.—Ligusticum Scoticum, L. A few plants of this species grow beside the salt creek on the west side of Black Point, East Lyme, Conn. A pretty close search of the salt marshes in this vicinity has failed to discover it at any other station, so that it must be accounted very rare in the State. It has, however, been collected by several persons on Fishers Island, N. Y., and is reported from Watch Hill, R. I., just over the Connecticut State line, but whether it is abundant or rare at these points I cannot say.

Desmodium sessilifolium, Torr. & Gray. This species was found in the extreme south part of the town of Norwich, Conn., near the track of the N. L. N. R. R. On the north shore of Trading Cove, which separates Norwich from Montville, rises a steep rocky and sandy hill covered with a mixed growth of hard woods, pitch pines, and hemlocks. The *Desmodium* grows, not very abundantly, on the warm southern slopes of this hill. More or less is to be found also along the banks of the railroad which here runs close along the west bank of the Thames river. Unfortunately the herbage beside the track is mowed so frequently that the plant does not get the chance to spread that it would otherwise have. Whether this species occurs also on any of the neighboring hills, or on the east side of the Thames, as seems not improbable, the writer has had no opportunity to ascertain.

CHAS. B. GRAVES, M.D.

New London, Conn.

Reviews of Foreign Literature.

Sur certains Rapports entre L' Arabie Heurense et L'Ancienne Egypte, résultant de son dernier Voyage au Yémen; par le Dr. G. Schweinfurth. M. E. Autran, Genève, 1890.

Situated on the high road to India, the southwest corner of Arabia has been from time immemorial the rallying point for all the tribes of the far east, and notwithstanding its accessibility and reputed character for hospitality, it has been a comparatively little traveled country. The history of botanical exploration in Yémen began 128 years ago, when Peter Farskal joined Karsten Niebuhr's remarkable expedition and six months later died in Arabia, leaving a valuable collection of scientific documents, which were published by Niebuhr under the title of "Flore Ægyptiaco-Arabique." Forskal's plants are now preserved at Copenhagen. Seventy-four years later a French botanist, P. E. Botta, collected in southern Arabia and his plants are now in the Muséum du Jardin des Plantes at Paris. In 1825 G. Erenberg and Hemprich explored Qunfuda and the surrounding valleys and their collections are among the most valuable in the Berlin museum. Albert Denflers traveled through Yémen in 1887 and during the winter of 1888-89 Dr. Schweinfurth collected 920 species and confirmed many of Forskal's discoveries. The ancient Egyptians cultivated certain trees, dedicated to certain divinities, and among them were the Persea of the ancient Greeks (*Mimusops Schimperi*,) and the Sycamore; the leaves and fruit of both trees having been frequently found in ancient tombs, where they had been deposited as offerings. The "Persea" (not to be confounded with *Persea gratissima*, Gaertn.) has for centuries disappeared from Egypt, but the Sycamore is still found there in large quantites, though only in cultivation. The region of the Upper Nile, rich as it is in Fig-tree species having characteristics that bring them into close relation to the Sycamore, has not as yet shown any in a wild state that might be considered its ancestor. Dr. Schweinfurth gathering from Forskal's notes that in Arabia were to be found species allied to the Egyptian Sycamore, was especially interested in searching for them and learned that the Fig-tree, known as "Chanès" in the mountains and as "Bourra" on the plains, is identical with the Egyptian tree which incontestably has its origin there. He also found the "Persea" growing wild and called "Lebbakh," a term used by the Arab geographers of the middle ages and which to-day in Egypt is appied to an Acacia introduced from India (*Albizzia Lebbek*,) and is now as "Lebbakh," a widespread roadside tree.

The fact that there are in Arabia to-day trees indigenous to the country that several centuries ago, and for three thousand years were considered as sacred in Egypt, may possibly throw great light on the ancient relations of the two countries.

A. M. V.

Index to Recent American Botanical Literature.

Algæ Brasilienses a cl. Dr. Glaziou collectæ. M. Mobius. (Notarisia, Anno v. 1065–1090, one plate).

An enumeration of eighty-two species of Brazilian Algæ collected by Dr. Glaziou. No new species are described. The following are figured: *Entocladia viridis*, *Bryopsis plumosa*, *Odontothallia microdonta* and *Galaxaura*, spec.

Algæ collected in the neighborhood of Toronto—A Preliminary List of. J. J. Mackenzie. (Proc. Can. Inst. 3d Series, vii. 270–274).

Acineta densa. (Bot. Mag. T. 7143).

Annual Report of the State Botanist of the State of New York. Chas. H. Peck. (Pamph. pp. 54, four plates. Reprint from the forty-third Report of the New York State Museum of Natural History, Albany, 1890).

As usual, Mr. Peck's annual report contains much of interest and scientific value. 229 species of New York plants have been added to the State Herbarium, of which 105 are new to it, besides many extra-limital species. Twenty-three different persons contributed. Mr. Peck's field operations were conducted in several counties. Under "Plants not before Reported," are *Hesperis matronalis*, from Albany Co., *Prunus avium*, from near Catskill, *Trapa natans*, established in Sander's Lake, near Schenectady, *Aster vimineus* not rare in the eastern part of Long Island, *Lacnanthes tinctoria*, Manor, Suffolk Co., *Cynodon Dactylon*, vacant lots in Long Island City. Some of these have, however, been previously found in other parts of the State. The others of this category are Fungi, of which the following are described as new: *Tricholoma grave*, *Clitocybe multiceps*, *Coprinus Brassicæ*, *Cortinarius glutinosus*, *C. annulatus*, *C. luteus*, *C. paludosus*, *Lactarius subinsulsus*, *L. mutabilis*, *Russula brevipes*, *Marasmius albiceps*, *Poria aurea*, *Irpex rimosus*, *Corticium subaurantiacnm*, *C. basale*, *Peniophora unicolar*, *Clavaria similis*, *Comatricha longa*, *C. subcæspitosa*, *Phyllosticta bicolor*, *P. Prini*, *P. Silenes*, *Phoma allantella*, *Plasmopora Viburni*, *Sporotrichum cinereum*, *Coniosporium Polytrichi*, *Stachybotrys elongata*, *Dematium parasiticum*, *Fusicladium destruens*, *Macrosporium Polytrichi*, *Isaria aranea-*

rum, Tubercularia carpogena, Fusarium Sclerodermatis, Glœosporium leptospermum, Underwoodia, a new genus of Helvellaceæ, with *U. columnaris, Helotium mycetophilum, Hæmatomyces faginea, Eutypella longirostris, Lepiota farinosa, Pholiota æruginosa* and *Phellorina Californica*, the three latter species extralimital.

Under "Remarks and Observations," *Ranunculus Clintoni*, Beck, now referred to *R. repens*, still occurs along the Erie Canal between Rome and Oriskany, *Lythrum alatum* occurs at Selkirk, Albany Co., *Sium cicutæfolium*, var. *brevifolium*, a new variety from Cedar Lake, St. Lawrence Co., and many other important notes on distribution.

There is also a monograph of the three New York species of *Armillaria* and a synopsis of those of the United States, and an account by Mr. P. H. Dudley of the growth of fungi on railroad timber. N. L. B.

Aristolochia longecaudata. (Gard. Chron., viii. 493, fig. 98).

Ascomycetes Novi. P. A. Karsten and P. Hariot (Revue Mycol. xii. 169–173).

Includes *Chlorosplenium tuberosum* from Cape Horn, *Nectria Harioti*, from New Granada and *Kullhemia phyllophora* from Brazil.

Black Rot of the Grape—Some Recent Observations on. B. T. Galloway. (Bot. Gaz. xv. 255–259).

Botany at the Indianapolis Meeting. C. E. Bessey. (Am. Nat. xxiv. 958-964).

List and abstracts of the botanical papers read before the American Association for the Advancement of Science, the Botanical Club of the Association and the Society for the Promotion of Agriculture during the August meetings of the present year at Indianapolis.

California Lilies. (Garden, xxxviii. Pl. 776).

Accompanying this article is a colored plate of *Lilium pardalinum, var. luteum, L. Bolanderi* and *L. maritimum.*

Catalpa—The. (Garden & Forest, iii. 533, 534).

Catalpa Trees—Two Remarkable. H. Brooks. Garden & Forest, iii. 536, figs. 68, 69).

Accompanying this article are representations of large individ uals of *Catalpa bignonioides* on the P. C. Brooks estate at West Medford, Mass. These trees have produced drooping branches which have rooted and produced shoots, thus forming a miniature forest of young *Catalpas.*

Contributions à la Flore du Paraguay—III. Polygalacées. Dr. Robert Chodat. (Mem. Soc. Phys. et Hist. Nat. Genève xxx. No. 8).

Under this title are described twenty-six species of *Polygala* found in Paraguay, twelve of which are beautifully figured in six plates. The drawings bring out clearly the style and seed characters.

Cruel Plant—The. Arthur Henry. (Proc. Can. Inst., 3d Series, vii, 226–229, illustrated).

An account of the method by which *Physianthus albens* catches and holds visiting moths.

Cucumber Root—The. (Am. Garden, xi. 691, illustrated).

Medeola Virginica is figured under this caption.

Dewberries—The. (Am. Garden, xi. 641, 642, illustrated).

Contains descriptions of *Rubus Canadensis, R. hispidus* and *R. trivialis,* with fig. of the second named species and a full page representation of *R. Canadensis,* var. *roribaccus,* which is described as a new variety, said to be native in the hills of West Virginia.

Distribution of Plants—The. V. M. Spaulding. (Am. Nat. xxiv. 819–831)

Professor Spaulding reviews in a very interesting manner the historical development of the study of this topic, beginning with Humboldt's essay in 1805. He points out some of the views held by him and subsequent authors, and concludes that the end has not yet been reached. It is to be regretted that this paper was not presented at Indianapolis, so that it might have been incorporated with the others there given, which are to be published as a group in the proceedings of the American Association.

N. L. B.

Eriogoneæ. (Gard. Chron., viii. 525, fig, 103, 104, 105).

Contains figures of *Eriogonum corymbosum, E. racemosum* and *E. Thomasii.*

Eriogynia—On the Genus. Sereno Watson. (Bot. Gaz., xv. 241, 242, Pl. xiv).

The discovery of a new rosaceous plant allied to *Spiræa cæspitosa*, Nutt. has determined the author to study certain allied species of *Spiræa* with the result that: "If *Eriogynia pectinata* is rightly separated from *Spiræa*, as I think, then *S. cæspitosa* should rather be joined with it than retained in *Spiræa*, and with it should go our new species, which I have accordingly named *E. uniflora*." Nevertheless the author admits that the differences between the species is so marked that he proposes to divide the genus into three sections as follows: *Eriogynia* proper, represented by *E. pectinata*, *Petrophytum* by *E. cæspitosa*, and *Kelseya* (named in honor of the discoverer, Rev. F. D. Kelsey) for *E. uniflora*. The three species are represented on the accompanying plate.

Eucalyptus and the Honey Bee. Mrs. R. F. Bingham (Bull. Santa Barbara Soc. Nat. Hist. i. No. 2, 32–34).

Eucharis Bakeriana. (Bot. Mag. T. 7144).

Ferns—Native. Mrs. J. T. Power. (Am. Garden, xi. 658–662, illustrated).

Contains figures of *Osmunda cinnamomea, O. Claytoniana, Aspidium acrostichoides, Polypodium vulgare* and *Pellæa gracilis.*

Ferns of the Channel Islands. L. G. Yates. (Bull. Santa Barbara Soc. Nat. Hist. i. No. 2, 8-10).

Polypodium Scouleri found on Santa Cruz.

Flora Brasiliensis—Fasc. CVIII. Cactaceæ. Carolus Schumann. (pp. 186-334, tab. 39-63).

This fascicle completes Vol. iv. Part 2. Twenty genera and about 130 species are described, a considerable number of the latter being new.

Food Plants of the Clover-stem Borer. Clarence M. Weed. (Amer. Nat. xxiv. 867).

Forms of Staten Island Plants. N. L. Britton. (Proc. Nat. Sci. Assn. S. I., Nov. 8, 1890).

The author notes the occurrence on Staten Island of *Sabbatia stellaris* forma *albiflora* and *Aster Novæ-Anglieæ* forma *roseus*.

Fruit Plants—The Evolution vnd Variation of. J. H. Bourn. (Trans. Mass. Hort. Soc., 1889, Part i, 14–29).

Lemon—On the Structure and Development of the. L. S. Ross. (Bot. Gaz. xv. 262–267, Pl. xvi).

From what is evidently careful study and examination, the author says: "that every part of the fruit has its origin from some part of the leaf." The pulp clubs are stated to be derived from the leaf hairs, and in this connection it is of interest to note that under the title "The Ideal Ovary," Mr. E. E. Sterns (BULLETIN, xvi. 77) says: "*Apropos* of the Orange I may add here the observation that the stalked, elongated, juice-filled cells of the pulp, springing from the inner surface of the carpellary leaf, are true trichomes in structure and position, and therefore, when we revel in the fruits of *Citrus Aurantium*, we are, morphologically speaking, eating hairs." The excellent figures greatly assist in understanding what has already been written on the subject.

List of Botanists of the Agricultural Experiment Stations in the United States. (U. S. Dept. Agric. Exp. Sta. Bull. No. 6, pamph. pp. 23, 1890).

This paper gives a list of the Agricultural Experiment Stations and their officers, together with a digest of the lines of work now being prosecuted. It was prepared by a committee from the Association of American Agricultural Colleges, consisting of Prof. Halsted, Prof. Scribner and Mr. Galloway.

Lyonothamnus asplenifolius. H. C. Ford. (Bull. Santa Barbara Soc. Nat. Hist. i. No. 2, 56–58).

An account of this beautiful tree as studied by Dr. Yates and Prof. Ford on the island of Santa Cruz.

Medicinal Plants Growing Wild in Santa Barbara and Vicinity. Mrs. R. F. Bingham. (Bull. Santa Barbara Soc. Nat. Hist. i. No. 2, 34-37).

Medicinischen Pflanzen von Alabama—Die. Carl Mohr. Pharm. Rundsch., viii, 257-262).

This part includes the species from Rosaceæ to Filices and terminates the series.

Mock Oranges. (Garden, xxxviii. 413, illustrated).

Under this heading are notes upon *Philadelphus coronarius*, *P. Gordonianus*, *P. speciosus*, *P. microphyllus* and *P. grandiflorus* —the latter figured.

Monographia Generis Coccolobæ. G. Lindau. (Engler's Bot. Jahrb. xiii. 106–229, t. v).

A monograph of the polygonaceous genus *Cocoloba*, including a discussion of its morphology. 125 species are recognised, of which a large number are described as new. *C. Floridana* Meisn. of the Florida Keys is referred to *C. laurifolia*, Jacq., a widely distributed species of the West Indies. A single species only is attributed to Bolivia, bnt Dr. Rusby brought home three from there and Mr. Bang has since collected another.

N. L. B.

Monterey Cypress—The. A. D. Webster. (Garden, xxxviii. 363, illustrated).

Account and representation of *Cupressus macrocarpa* as growing at Castlewellan.

Palms of the California Border—The. S. B. Parish. (Garden & Forest, iii. 542).

The author contends that the identity of the *Washingtonias* near the southern boundary of California is very uncertain and the supposed *W. filifera* of San Bernardino Co. may be *W. robusta*, and if so it would be the proper name for the only true palm known from the State of California.

Pereskia aculeata. (Bot. Mag. T. 7147).

Physianthus albens. Chas. Armstrong. (Proc. Can. Inst. 3d Series, vii, 230, 231).

Apparently an independent account of similar investigations indexed under the heading "The Cruel Plant."

Pinus Montezumæ. (Gard. Chron. viii. 466, figs. 91, 92, 93, 94, 96).

An article describing this species as it is growing in Cornwall, England.

Plane Trees—Origin of the. Lester F. Ward. (Am. Nat., xxiv. 797-810, Pl. xxvii).

The author criticises a recent paper upon this subject by Johann Janko in Vol. xi. of Engler's *Botanische Jahrbücher* and revises the geological distribution of recognized fossil species of the genus *Platanus.* There is considerable diverstiy of opinion between the two authors and there is evidently room for further criticism.

The article is accompanied by representations of leaves of *Platanus orientalis* L., *P. occidentalis*, L., *P. racemosa*, Nutt. and *Sassafras Cretaceum*, Newb.

Plants collected in 1889 *at Socorro and Clarion Islands, Pacific Ocean.* Geo. Vasey and J. N. Rose. (Proc. U. S. Nat. Mus. xiii. 145–149, reprinted).

These islands are situated about 260 miles south of Cape St. Lucas and were visited in 1889 by the Fish Commission steamer "Albatross," the botanical collections being made by Mr. Chas. H Townsend. The following new species are described: *Teucrium Townsendii*, *Cardiospermum Palmeri*.

Promising Wild Fruits—II. A. A. Crozier. (Am. Garden, xi. 649–653, illustrated).

Crabs, Plums, the Buffalo Berry, Cacti and Persimmons are discussed in this contribution, and *Pyrus coronaria* and *Diospyros Virginiana* are figured.

Rubus Arten der Antillen. W. O. Focke. (Abhand. Naturn. Ver. Bremen, xi. 409–412).

Descriptions of the three species known from the West Indies: 1. *R. durus*, Sauv. (Cuba, Wright, 2410); 2. *R. florulentus*, Focke. (Porto Rico, Sintensis 4100; 4669, with var. *Eggersii*. Focke (St. Domingo, Eggers 2065); 3. *R. Domingensis*, Focke (St. Domingo, Eggers, 2281). All three have ternate leaves. There is apparently a fourth species in Guadaloupe.

N. L. B.

Shrubs of Santa Barbara County—The indigenous. H. C. Ford. (Bull. Santa Barbara Soc. Nat. Hist. i. No. 2, 29–31).

A list of about sixty species.

St. Johnsworts—Two American. (Garden & Forest, iii. 524, 525, figs. 26, 27).

Under this heading are described and figured *Hypericum prolificum* and *H. densiflorum.*

The Silva of North America. A Description of the Forest Trees which grow naturally in North America exclusive of Mexico. By Charles Sprague Sargent, Director of the Arnold Arboretum of Harvard University. Illustrated with Figures and

Analyses drawn from Nature by Charles Edward Faxon and engraved by Philibert and Eugene Picart. Volume I. Magnoliaceæ—Ilicineæ. Large 4to, pp. ix+119; 50 plates. Boston and New York. Houghton, Mifflin and Co., 1891.

It is with a sense of profound gratitude and the highest admiration for the immense labor devoted to the work that we cordially welcome the appearance of the first volume of this magnificent book. Professor Sargent has been engaged in the accumulation of the material now collated and given to the world, for a large number of years, and the result will rank with the best classical works on Science and Art that have ever been issued at home or abroad.

The book is sumptuously printed on heavy paper and cut with broad margins. The illustrations are superb. The descriptions are excellent and the notes on geographical distribution, history and economic importance are of the highest interest and value.

The descriptions of genera and species, which follow the sequence adopted in the Genera Plantarum of Bentham and Hooker, are prefaced by an account of the various publications which have been especially devoted to our trees; the earliest being Humphrey Marshall's "Arbustum Americanum" and the most recent noted Professor Edward L. Greene's "West American Oaks."

The author's definition of a tree is certainly the most rational one. He says "The line which divides trees from shrubs is a purely arbitrary one, and an attempt to separate them is often unsatisfactory. A division based on habit rather than on size seems, on the whole, more easily applied than any other, and therefore less objectionable. So, for the purposes of this work I have considered as trees all woody plants which grow up from the ground with a single stem, whatever size or height they may attain." As to the number of species coming within this definition it is stated "The forests of North America, exclusive of Mexico, are now believed to contain four hundred and twenty-two, besides numerous varieties."

The question of nomenclature is treated of in the following sentences: "I have adopted the method which imposes upon a plant the oldest generic name applied to it by Linnæus in the first edition of the "Genera Plantarum," published in 1737, or by any subsequent author, and the oldest specific name used by Linnæus in the first edition of the Species ,Plantarum, published in 1753, or by any subsequent author, without regard to the fact that such a specific name may have been associated at first with a generic name improperly employed. The rigid application of this rule leads to the change of many familiar names and considerable temporary confusion. But unless it is adopted, anything like stability of nomenclature is hopeless, and the sooner the changes which are inevitable in the future are made, the more easily students will become accustomed to them and acquire a knowledge of the correct names of our trees." This position will be heartily welcomed by almost every American botanist. Indeed, we believe that the publication of this great work on this principle will practically remove all opposition to the method here adopted, and which some of us have for many years foreseen as the only escape from a very troublesome question.

The following species are described and figured in this volume:—*Magnolia fœtida; Magnolia glauca; Magnolia acuminata; Magnolia tripetala; Magnolia Fraseri; Liriodendron Tulipifera; Asimina triloba; Anona glabra; Capparis Jamaicensis; Canella alba; Gordonia Lasianthus; Gordonia Altamaha; Fremontia Californica; Tilia Americana; Tilia pubescens; Tilia heterophylla; Guiacum sanctum; Xanthoxylum Clava-Herculis; Xanthoxlum cribrosum; Xanthoxylum Fagara; Ptelea trifoliata; Helietta parvifolia; Amyris maritima; Canotia holacantha; Simaruba glauca; Kœberlinia spinosa; Bursera Simaruba; Swietenia Mahogani; Ilex opaca; Ilex Cassine; Ilex vomitoria; Ilex decidua* and *Ilex monticola.* According to our view the correct name of the last is *Ilex montana.*

The Silva will be completed in 12 volumes, to be issued two each year. The price is fixed at $25.00 per volume. It ought to find a place in every public library in this country and abroad and the proprietor of every country place will be one thing short of complete equipment, until a copy of it is within reach in his drawing-room.

N. L. B.

Trees of North Eastern America—The. Charles S. Newhall, with an introductory note by Nath. L. Britton (8vo. New York. G. P. Putnam's Sons. 1890).

This work is an illustration of what has been styled "Delatinized Botany." In it no descriptive terms are used other than those consisting of common English words. Such works are written and consulted under the apprehension that there is an easier and more convenient way of expressing and receiving scientific ideas than by the use of scientific language. That this is a serious misapprehension there is no doubt. It belies the fundamental principle of scientific language, whose precise object is the reaching of the result by the shortest and most convenient method consistent with accuracy. It is true that certain results more or less valuable may be attained by the method of this author; but even where the results are not in themselves erroneous they must in some cases involve false teaching. There is a way of compromising by the admission of the minimum number of technical terms, using them only where it is necessary to avoid giving a false impression—which seems to us much better. For instance Mr. Newhall substitutes for *obovate* the term "inverse egg-shaped." How unfortunate! An egg is ovoid—solid—while ovate refers to a surface. And then, who knows which is the "reverse" way of an egg? The prefix *ob* in *obovate* does not refer to the reversion of the egg, but to the reversion of the ovate shape of the leaf. Both ovate and obovate are the technical creations of scientific language, created for the very reason that they were needed, and in this form as the most convenient one. How much easier, as well as better, for the author to have taught his readers the use of the terms *ovoid*, *ovate* and *ob*, thus elevating them and his subject at the same time, than to have thus misled the one and degraded the other! Is this not ob-education? But it is not intended to decry the attempt to provide useful works for those unable to study nature scientifically. Neither is it intended to decry the value of Mr. Newhall's work; but only to criticise certain false methods which we are sorry to see receiving his support. On the whole we can heartily endorse the statements in the introductory note that there is great need of such a popular work. We anticipate and bespeak for the work a large sale, but we hope that the author will in a subsequent edition substitute graceful and accurate terms for a number of clumsy and inaccurate ones. The illustrations also should be improved, as they are decidedly below the standard of publications of this kind. H. H. R.

Umbelliferæ:—Notes on North American.—II. John M. Coulter and J. N. Rose. (Bot. Gaz. xv, 259,-261, Pl. vv.)

The following are described as new: *Hydrocotyle Bonariensis*, Lam. var. *Texana*, and *Arracacia Donnell-Smithii*, the latter figured.

Yuccas.—Some Good. A. Davenport. (Am. Garden, xi. 666, 667, illutrated.)

Contains a picture of *Yucca gloriosa* var. *recurvifolia.*

Proceedings of the Club.

The Regular Meeting was held on Tuesday evening, Nov. 11th, the President in the Chair and fifteen persons present.

The Chairman of the Committee on Instruction reported favorably on the season's work. The majority of the students are continuing their botanical work.

The paper as announced, "Notes on the Spring Flora of the Southern Alleghanies," was then given by Miss Anna Murray Vail.

Among the many plants shown *Clematis Addisonii,* the new species which Dr. Britton has named for our President, attracted most attention.

The Second November meeting was held Nov. 26th, the President in the Chair and twenty-nine persons present.

Mr. R. S. Williams and F. D. Kelsey were elected Corresponding Members and Mr. F. W. Anderson an Active Member.

The amendment to the Constitution was voted upon and carried unanimously.

The regular meeting days will now be the second Tuesday and last Wednesday of each month.

Dr. Rusby's paper, "Collecting in the Tropical Andes," then followed. At its close the Club listened with great attention to remarks corroborative of Dr. Rusby's experience and descriptive of his own from Dr. Thos. Morong, who has just returned from Paraguay and Chili.

A General Index to Vols. VII–XVI (1880–1889) is being prepared, and will probably be issued early in 1890.

VOL. XVII. JANUARY, 1890. No. 1.

BULLETIN
OF THE
TORREY BOTANICAL CLUB,
A MONTHLY JOURNAL OF BOTANY.

EDITED BY
NATHANIEL LORD BRITTON,
AND OTHER MEMBERS OF THE CLUB.

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